

..THE IRON AGE..

NEW YORK, JULY 23, 1931

ESTABLISHED 1855

VOL. 128, No. 4

TRAINING WORKERS TO BECOME "ACCURACY MINDED"

By WILLIAM F. KRUSE

Head of Educational Department, Bell & Howell Co., Chicago

TRAINING of employees generally and of apprentices in particular, to hold in proper regard the extraordinary accuracy indispensable in the making of certain types of precision equipment is a problem that confronts shop executives and educators alike. Certain contributions that are believed to be novel, and their synthesis into a single educational system, have been developed by the Bell & Howell Co. The company makes motion picture equipment that sets a high standard in manufacture and new development in an industry whose only law is the law of constant change. The problem of training and developing the craftsmanship and engineering skill necessary to maintain and extend its position in the industry is sufficiently important to this company to engage the personal attention of its president, J. H. McNabb.

In no branch of industry is accuracy of more importance. The slightest variance of registry at the aperture plate of a motion picture projector, for example, is quickly multiplied 300 times on the screen. Again, in applying a Filmo camera to a certain highly

WHEN a company makes a product of such intricacy that accuracy and extreme skill are prime essentials in its workmen, the training of workers becomes more than the usual apprenticeship procedure. First of all, workers on such a job must become "accuracy minded," so that rigidly maintained standards may be adhered to. The Bell & Howell Co., Chicago, maker of motion picture equipment, has developed an educational program of its own that offers suggestions to other companies whose requirements in manufacturing are similarly exacting.



specialized task in photomicroscopy—a motion picture of the Brownian movement—a magnification of 250,000 diameters has been attained. Added to this factor of erroneous magnification of possible error in the projection of greatly enlarged images, we have the astounding rapidity with which certain parts in projector and camera have to operate—the triple lead worm shaft on the governor of the 70-D camera must operate at a speed of 30,000 r.p.m. The shuttle tooth on a super-speed Filmo camera must complete, during each second of operation, 128 cycles of four distinct movements each.

This type of work demands closely limited and rigidly maintained standards that absolutely baffle the "average" mechanic. Therefore, as pointed out in an article by C. A. Ziebarth (THE IRON AGE, March 26, 1931, page 998), "a point not to be overlooked is the deliberate purpose of making the workers, inspectors and shop supervisors *accuracy minded*." This can be accomplished only by educational methods.

The entire educational program of Bell & Howell is centered on this essential point of accuracy minded-

SHEET No. 1

APPRENTICE SHOP REPORT—Covering 12 Months

THE personnel department (at left) keeps a twelve-month record of each apprentice.

A PERSONNEL development record affords ready reference as to progress and educational activity.

ness. The program involves four distinct categories, four different types of men with varying capacities and functions—craftsmen, foremen, engineers and office executives—and trains them for as many different types of work.

First of these types of training is that of the machinist and tool-maker apprentices, who go through a four-year course intended to develop craftsmen capable of maintaining the somewhat exceptional standards called for in this particular branch of industry. Suitable boys are selected from among candidates recommended by the Industrial Education Department of the National Metal Trades Association. A definite educational minimum is insisted upon. Technical high school graduates are preferred, and are given one year's credit on their apprenticeship time in considera-

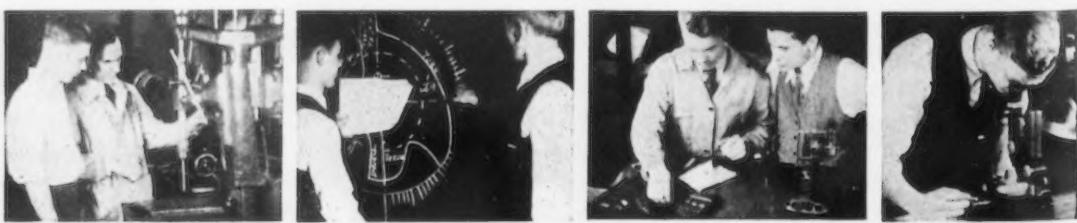
tion of such preliminary education. The regular contract form of the N. M. T. A. is used and is signed by the employer, by the boy and by his father or other legal guardian. It provides for a probationary period of 60 days, during which the termination of the contract is optional with either party, this period being applied to the apprenticeship term if the boy's showing is satisfactory. The hourly rate of wages is fixed at the time the contract is signed, and definite provision is made for regular increases in this rate for each of the eight six-months' periods covered.

Apprentices Are Afforded Every Opportunity for Perfection

During the entire period of apprenticeship every effort is made to give the boy a maximum opportunity to perfect himself in the necessary craft skills, under

Two questions:

- (1) How can a boy learn a skilled trade?
- (2) How can precision industry assure itself good mechanics?



conditions identical to those prevailing for graduate craftsmen. Any distinction that is made, however, tends to favor the apprentice. For instance, when business conditions result in temporary curtailment of forces and hours, the boys are kept on full schedule until a point is reached when further discrimination is harmful. Only then is there a uniform application to the boys of the short-time order. It is stated by the N. M. T. A. vocational training director, Henry J. Roesch, that despite ups and downs of business conditions during the past four years not a single apprentice under his general direction has been "lost." By dividing working time evenly, the training of none of the boys is seriously interrupted, the net result being only a slight postponement of graduation date. At the end of the training period each boy receives his diploma, his journeyman's card, and a check for \$100 as a bonus for having completed the course.

Each apprentice spends one full 8-hr. day each

APPRENTICE EMPLOYMENT RECORD										
NAME					DATE OF BIRTH					
ADDRESS					CLOCK NO.					
TRADE					EDUCATION					
SCHOOL LAST ATTENDED										
EMPLOYER										
ADDRESS										
PARENT OR GUARDIAN					NATIONALITY | FATHER MOTHER					
ADDRESS										
DATE INDENTURED	19	DUE TO FINISH	19	DATE REPORTED	19					
CREDIT FOR EDUCATION					WKS. OR PREVIOUS EXPERIENCE					
LAST EMPLOYER										
DATE	19	SIGNED								
NOTE: TO BE FILLED OUT AND MAILED WITH COPY OF CONTRACT TO CHICAGO BRANCH, NATIONAL METAL TRADES ASSOCIATION										
MT-A-2										

week, at full pay, in the study of mathematics, drafting, shop practice, and general science at the Washburne Apprentice School, maintained by the Chicago Board of Education as part of its continuation system. The school reports regularly to the plant on the attendance and grades of each boy, these grades becoming a part of the detailed record of the progress of each boy in skill, knowledge, and speed. On each job the boy learns, consecutively, the mathematics, the drafting, and the actual machining of a useful part to exact specifications. His rating is based on the finished product. If this does not conform to specifications, he must begin again from the very start, just as he would have to do in actual practice. Thus figuring and drawing are not looked down upon as ab-

SHOP PROGRESS REPORT OF									
	Speed	Workmanship	Knowledge	Attitude	Average	Times Late	Hours Lost	From	To
Jan.								19	19
Feb.									
Mar.									
Apr.									
May									
June									
July									
Aug.									
Sept.									
Oct.									
Nov.									
Dec.									
GRADING— 91-100 81-90 70-80 Below 70 (Exceptional) (Good) (Fair) (Unsatisfactory)									
SPEED—Rate at which he works, compared with normal speed for job.									
WORKMANSHIP—Quality as compared with standard requirements.									
KNOWLEDGE—General knowledge of this class of work.									
ATTITUDE—Interest in work, conduct toward superiors and fellow workers.									
MT-A-2									

MONTHLY report cards (above) are sent to parents for signature.

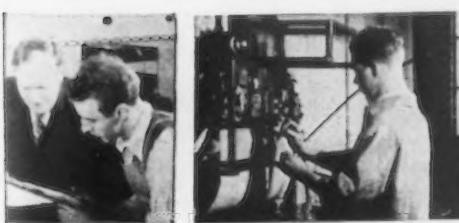
♦ ♦ ♦

COMPLETE records are kept of apprentice employment.

stract studies, but prove themselves in practice as part of the job itself. This is an extremely important lesson for the young mechanic to learn.

Boys Work Under Supervision of Apprentice Coordinator

In the plant the apprentice is under the direct supervision of the foreman or head of the department in which he is at work. At the end of each month the department head assigns a rating on each of the points covered in the report. However, the immediate supervision over the general progress of the boys in the shop is exercised by the apprentice coordinator, who attends to their transfer from one department to the next, in conformity to the training schedule, and who looks after their interests generally. This coordi-





ties, and encourage their personal development inside and outside the shop. It is he who collects each boy's rating from the respective department heads and turns these reports over to the personnel manager for transmission to the boys' parents.

The attendance and rating at school are also entered on these monthly report cards. In order to test the importance assigned to these reports by the parents, they were held back one month—within less than a week practically every boy's home had been heard from with an inquiry as to the whereabouts of the customary report card.

Record is also kept of collateral night school work, of books drawn from the shop, engineering, or office libraries, all three of which are open to any employee. The apprentices make rather better-than-average use of available books, particularly those in the shop library.

Apprentices Are Taught "Whys" of All Operations

It is not enough to inculcate only the manual skill necessary in turning out fine precision work. Rather, a knowledge of the "why" of these narrow limits is necessary for a conscientious, consistent adherence, day in and day out, to the standards set. To make accessible this knowledge a training conference, holding one-hour sessions weekly from October to May, is open to all shop apprentices, as well as to the student engineers and executive apprentices whose training is detailed below. Here the boys are shown not only how their product as a whole is made and the relationship of their own particular jobs to the finished item, but actually how the cameras, projectors and accessories are used in the field, as well as how basic scientific principles are applied in their design.

Naturally, with a product so widely used for purposes of visual instruction, visual teaching tools play an important part in the methods of the conference. The products themselves, the various parts and sub-assemblies, cut-away models, tools, gages, etc., are passed around for examination or projected on the screen through an opaque projector. Motion pictures on shop practice, on the use of tools, on the making of various types of films, etc., are shown frequently. Pictures taken by the boys themselves are projected for constructive criticism. Any of the firm's products may be borrowed without cost by those attending the conference, and their free use (outside the plant) is encouraged and guided by competent instructors from the technical, production, and sales departments. These conference meetings occasionally

nator makes it a point to spend at least a few minutes every day with each of the boys, as they stand at their particular task. In this way he can keep a personal check on their progress, straighten out eventual difficulties,

take on a more social character—motion pictures are made and shown, or short talks are given and diplomas and bonus checks are presented here by senior executives. The meetings take place immediately after closing time and last exactly one hour. Attendance is on a voluntary basis, though regular and active attendance is noted on the employee development records that are consulted by senior executives in filling higher vacancies from the ranks.

Training Course Also Offered to Student Engineers

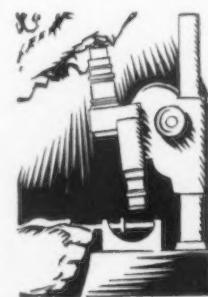
A second type of training is that of the so-called "student engineer." The basis of Bell & Howell equipment is not only fine craftsmanship, but unquestionably sound design that strives to keep pace, or rather one step ahead of the turbulent forward rush and constant change characteristic of the cinema world. A special building, the engineering laboratory, houses the development departments, and so great have been the demands that at this writing a third story is being added to accommodate the additional experimental and demonstration facilities made necessary by the advent of sound and other recent innovations in this fast-moving industry.

The student engineer must have all high school credits necessary to enter a first rank engineering college. Students are aided in going through the co-operative courses in mechanical engineering offered by the University of Cincinnati. There they study a month and then work in the Bell & Howell plant a month, alternately for a period of five years. The company advances the tuition fees, to be repaid within

Department	Machinist Apprentice	Toolmaker Apprentice	Student Engineer (Weeks)
Raw stock	1 mo.	1 mo.	1
Rehabilitation	1 mo.	1 mo.	2
Drill press	5 mo.	2 mo.	4
Hand mill	6 mo.	...	3
Hand screw machine	4 mo.	2 mo.	3
Automatic screw mach.	5 mo.	2 mo.	6
Engine lathe	5 mo.	6 mo.	7
Power mill	3 mo.	6 mo.	7
Surface grinder	2 mo.	2 mo.	6
Assembly	3 mo.	...	6
Heat treating	2 mo.	2 mo.	2
Plating and enameling .....	...	...	2
Planning	2 mo.	...	1
Inspection	2 mo.	1 mo.	4
Bench lathe and lapp.	3 mo.	2 mo.	...
Drafting	2 mo. (and tool design) 3 mo.	...	...
Shaper and maintenance	1 mo.	3 mo.	...
Lens repair and access.	1 mo.	...	...
New bench work .....	...	10 mo.	...
Tool repair .....	...	5 mo.	...

five years, after graduation. During this time the graduates are employed in engineering and development tasks for which they have already fitted themselves at the same plant during five years (or more) of work and study.

At the end of each school month the boy reports to the plant's educational counselor on his school work, while a shop coordinator (who also looks after the progress of the apprentices proper) keeps the counselor in close touch with the boy's work in the plant. A regular system of



reports covers this contact, and both the president and the general superintendent take personal interest in the seasoning of this "timber" for future use.

Workers for Sales or Office Positions Are Also Trained

Needless to say the shop time schedule of the student engineers is not as extended as that of the craft apprentice. The "Cincinnati boys," as well as another group taking advanced work in Chicago evening colleges like Lewis or Armour, have less time in each of the shop departments, but they stay long enough to learn how to operate every machine, as well as to master the routine and standards of the various types

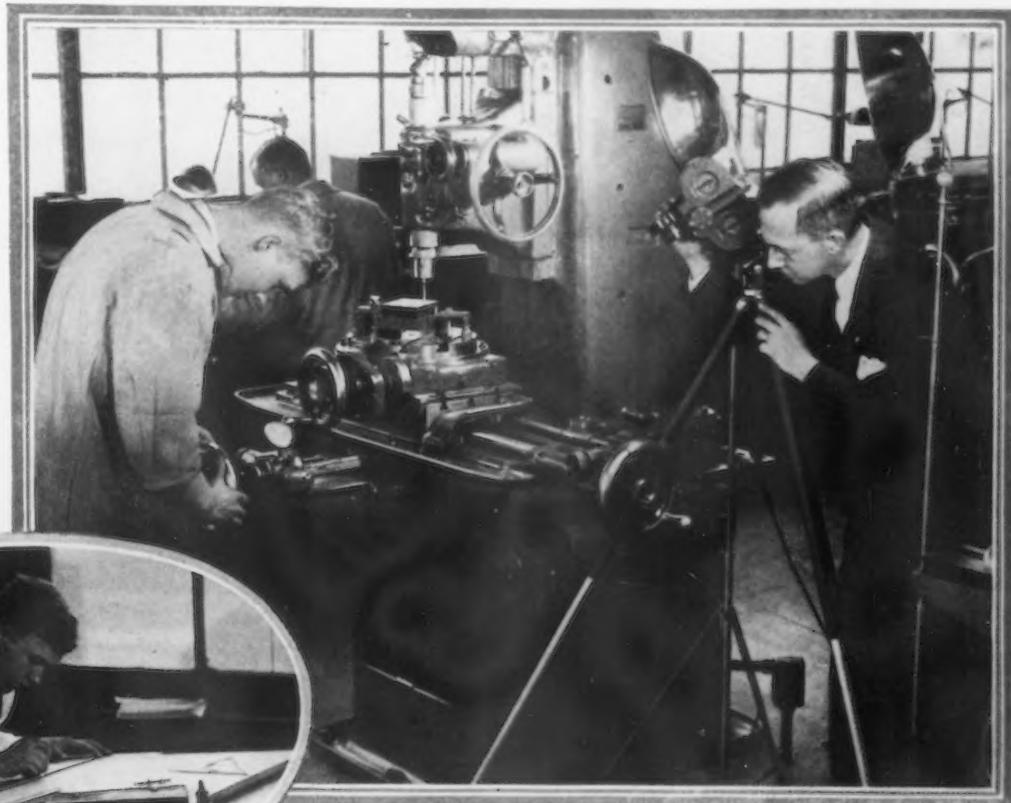
of apprentice training are, of course, also considered in connection with the foremen's conference.

Moving Picture Reel Depicts the Training Schedule

As might be expected from a manufacturer of motion picture equipment, this whole training schedule has been recorded in a single reel of 16 mm. motion pictures, and can be shown on the screen in much less time than it takes to put it down on paper. This film is entitled "Two Questions—One Answer," and has been given prominent place on the official programs of local and national meetings of manufacturers' associations, teachers' conventions and other types of school gatherings.

TOOLMAKER apprentices are taught to hold ten-thousandth limits on a jig-borer.

THIS boy figures his job in the mathematics class, lays it out on the drafting board and then goes into the shop to make the part on a boring mill.



of work. A comparison of these schedules is given on the opposite page.

The third type of training is intended to qualify "non-technical" workers or "executive apprentices" for responsible office posts in the sales, service and similar departments, as well as for branch office work. These young men are put through a regular two-year course that includes almost every phase of the organization—stores, receiving, planning, repair, inspection, stock record, service, traffic, advertising and sales. As in the case of the shop apprentice, a monthly report is required on each boy from the head of the department in which he has been engaged.

The fourth type of training is the foreman's conference, taking up in detail the course outlined by the N. M. T. A., under the direction of the Bell & Howell assistant superintendent of manufacture. Questions

The film is a human document throughout, beginning with a boy caught in the act of framing his high school diploma, and immediately reaching for the "want ad" section of his daily newspaper to begin his quest for a livelihood. Finding that experience is an absolute prerequisite in his chosen line, that of the machinist and toolmaker, he applies to an industrial educational counselor for an opening. In the film this part is actually taken by Henry J. Roesch, in charge of this work for the Chicago branch of the N. M. T. A., while the boy himself is played by a young toolmaker graduate who has just completed his course of training with Bell & Howell.

"You can earn more money right now in production work than as an apprentice." This hard truth from the lips of Roesch, who certainly knows what he

is talking about, does not discourage the boy. "I know," he replies, "but how about five years from now? Anyway, I want to learn how to do things right."

The details of his introduction into apprenticeship at the Bell & Howell plant follow quickly, and the role of the Chicago educational system in fostering the training of skilled workmen is presented in an extensive section of the film devoted to the Washburne Apprentice School. The instructors at the school co-operated whole-heartedly in making this an accurate presentation of the workings of an effective vocational



Precision gages are every day tools in the "finishing school."

school. Studies are shown to be closely integrated with the work at the plant, where the boys learn, under competent and painstaking supervision, how to operate every machine in the establishment. We see our youngster in the factory, for example, grinding the shuttle cam on which a variance of 0.0006 in. means "reject," using jig borers with integral ten-thousandth gages as his daily job, learning the use of Johannsen blocks and delving into the mysteries of the toolmaker's microscope.

The film ends with the presentation of the diploma, bonus check, and card to the young graduate toolmaker. The entire picture was produced with 16 mm. "amateur" equipment of the type used in hundreds of plants for motion study, sales, publicity and other work. The same results are reported to have followed the making of a similar two-reel picture on apprentice training, entitled "Opportunity," by the General Electric Co.

These two questions, "How can a boy today learn a skilled trade?" and "How can precision industry assure itself an adequate supply of well-trained highly-skilled mechanics?" are shown, by means of motion pictures, to have a common answer—"properly organized and intelligently directed apprentice training."

Mass Production Methods Have Not Lessened Need for Skill

With the advent of mass production, views have been expressed in some quarters that this would lead

to the abolition of skilled craftsmanship and lessen the need of apprenticeship training. How completely erroneous is such a view is seen by all today, since the toolmaker in modern industry assumes a greater rather than lesser importance. Modern industry demands a greater uniformity of parts, a stricter adherence to definitely set standards than has ever been known. This in turn is predicated upon a higher level of skill on the part of the key mechanics who make the tools and gages. An effective educational program, designed to give a promising young mechanic not only the manual dexterity and mental alertness, but also the "accuracy-mindedness" so essential to the maker of the tools of modern industry, is a necessary factor in every large industry's production planning.



Resistance to Grease Flow in Feed-Pipe Lines

AMONG the features of steel mill roll-neck lubrication brought out in a symposium on that subject in Pittsburgh, in February, under the auspices of the Association of Iron and Steel Electrical Engineers, was the resistance to feeding of various kinds of greases through pipes. A contribution by M. J. Helmes, Springfield, Mass., and J. G. Griffith, Pittsburgh, included a table showing variations in this resistance with different diameters of feed pipe and temperature and kind of grease.

With forced-feed grease lubricators operated in a positive mechanical manner this matter is of some importance. The lubricant is delivered to the feed points with consistent flow against the different resistance pressures in the feed-pipe lines. A minute adjustment of the quantity of lubricant to be fed to the bearing, in maintaining the lubricating film, is made possible.

Penetration or consistency and melting points of the three greases covered in the table have been measured by the method D-217-27-T of the American Society for Testing Materials. Grease No. 1 has a penetration of 260 and a melting point of 195. Grease No. 3 has a penetration of 200 and a melting point of 200. Grease No. 5 has a penetration of 120 and a melting point of 200. The table follows:

Feed Resistance with Different Diameters of Feed Pipe, Temperature and Kind of Grease

Kind of Grease	Tempera- ture Deg. F.	Feed Resistance in lb. per sq. in. per foot of Feed-Pipe Line			
		0.2362	0.3150	0.3750	0.5
Grease No. 1	68	23.6	17.2	12.9	8.6
	32	34.4	23.6	17.2	12.9
	14	51.6	34.4	21.5	17.2
	— 4	77.4	43.	30.1	21.5
Grease No. 3	68	30.1	21.5	15.05	10.75
	32	47.3	30.1	21.5	15.05
	14	77.4	38.7	30.1	21.5
	— 4	107.5	55.9	38.7	30.1
Grease No. 5	68	43.	30.1	21.5	12.9
	32	77.4	47.3	25.8	17.2
	14	94.6	64.5	34.4	23.6



Rittase, Philadelphia

MECHANIZED industry, to some lay minds, resembles this purposeless confusion of gears with their imprisoned robot. But the trained engineer and thoughtful industrialist view mechanization as the logical means to increase consumption and raise living standards through cost reduction.



SAVING COST IN MAKING

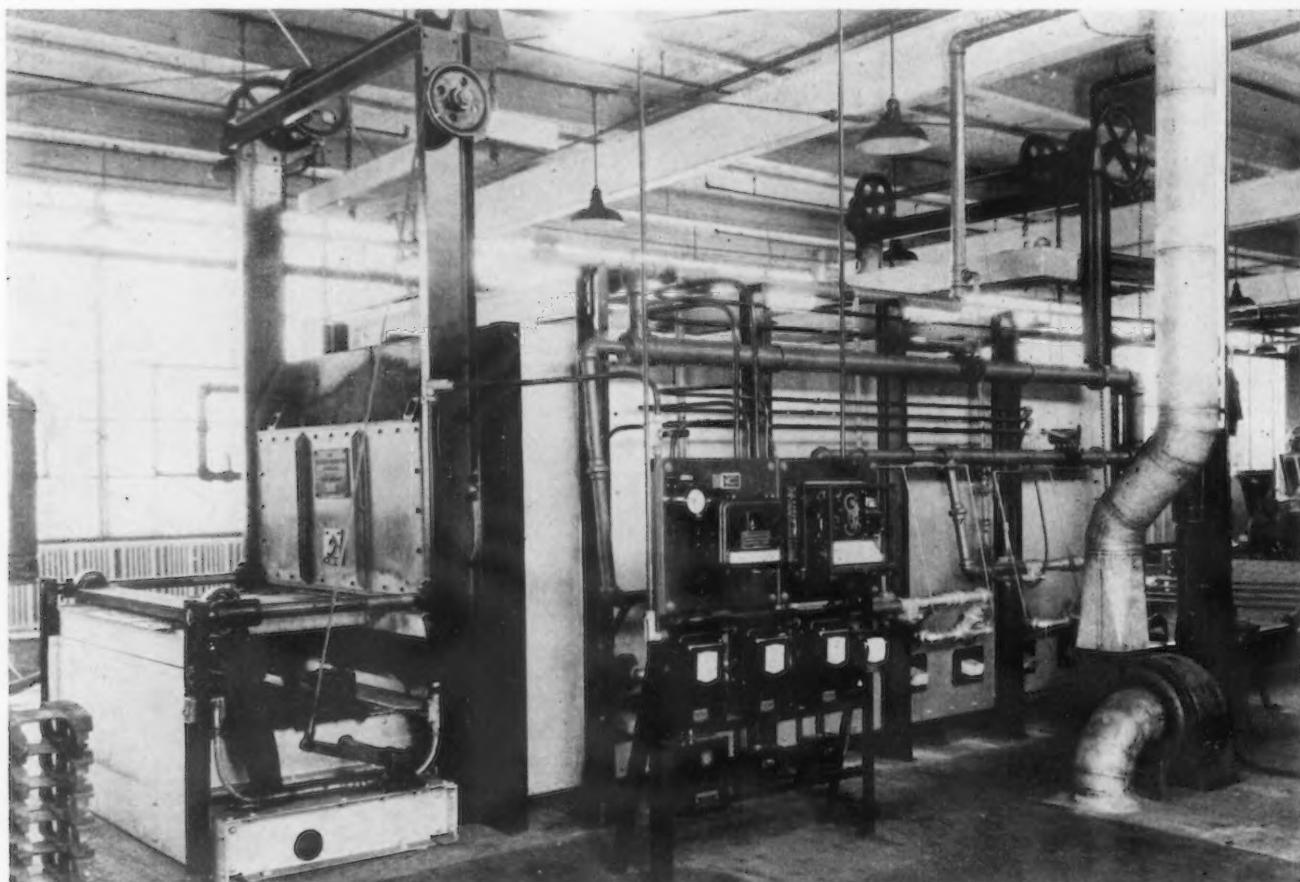


TRACTORS BY

A COMPLETE rearrangement made in the plant of the Cleveland Tractor Co., Cleveland, involves radical changes in the method of receiving raw material, in routing work in process and in assembling. These changes have resulted in marked economies in material-handling costs as well as in final production costs. An extensive system of overhead conveyors is provided for handling work in process and to the assembly line. Tractors now are assembled progressively on a moving power-

driven conveyor. These tractors are of the crawler type, made for both industrial and farm use.

Production processes have been decentralized under the new arrangement. Each manufacturing department has its own special equipment for the complete production, heat treatment, inspection and testing of material in that department. Thus, when the unit leaves the department it is a finished part or sub-assembly ready for the final assembly. With the conveyor systems trucking is almost entirely eliminated,



Loading end of the pusher-type hardening furnace for track shoes. The pusher parts—lever and pusher bar—appear at left.



PRIMITIVE means of transportation contrast sharply with the modern, as depicted in panel of the 5-ton bronze door of the Imperial Chemical Industries building in London.

SYNCHRONIZING OPERATIONS

STRAIGHT-LINE manufacture, with parts fed in at the side at the points where they enter the assembly, is the basis of the new layout in the plant of the Cleveland Tractor Co. Even raw materials are received opposite points where fabrication begins, instead of in a general storehouse. Many pieces of new equipment have been put in to do the specific job from start to finish; heat-treating furnaces, for instance, are at the proper place in the production line, instead of off in a separate department.

inventories are kept low and there is a minimum storage of finished parts.

There is a steady flow of parts in process, and danger of shortages is avoided. The production departments and conveyors and final assembly line are synchronized, so that the parts reach their several destinations along the line in the volume needed. To attain the highest efficiency, considerable new machinery for special operations in production work has been installed.

Raw Materials Enter Where Needed

Economies in handling start with the method of receiving raw materials. Whether shipped by truck or rail, these are delivered at receiving stations at points where the material is to be given first operations, thus eliminating considerable local handling and trucking. There are 75 of these receiving stations. After being unloaded, the material moves progressively through machine operations and heat treatments to sub-assembly or final assembly line. With the material-handling system used, little need is found for a central receiving station or for a general stockroom. An employee of the receiving department checks in the incoming material at the department in which it is to be used.

Of the four parallel buildings in the plant, three are used for regular production work. The fourth recently has been fitted up for the exclusive manufacture and stocking of service parts. A railroad switch track extends the full length of each building along the outer side. Inside the building along the same

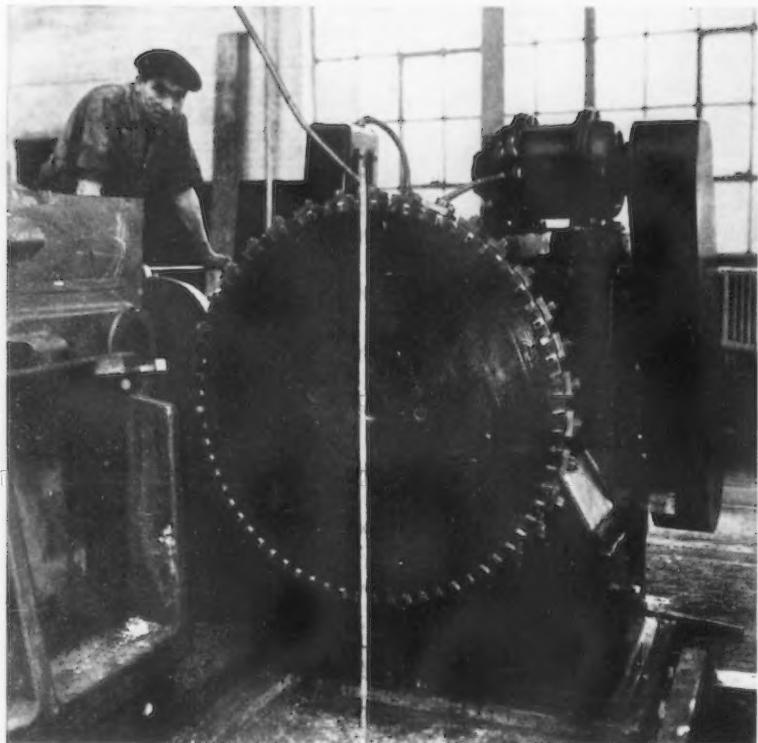
side is a wide aisle for trucks, the latter handling the larger part of the incoming material.

Most of the machine work is done in the building in which the tractors are assembled. This is divided up into various complete manufacturing units equipped for progressive operations, and in which the work is handled between operations by monorails and roller conveyors. Raw stock is delivered by trucks in the aisle on the one side, or through doors from the railroad siding outside, at the point where the operations start. It moves thence in a straight line across the bay for successive operations until it reaches the assembly line, on the opposite side of the building. The departments are so located that a part when finished is at the point where it is wanted for assembling.

Heat-Treating Furnaces in Production Lines

With the present sub-division of the plant and the complete manufacturing units all heat-treating equipment is located in the production lines where it is used. This eliminates hauling parts to and from a centralized heat-treating department. A special heat-treating furnace is provided for each class of work, each furnace being selected because of its suitability for that class of work; and it is not used for any other kind of work.

Parts not made in the main machine shop and assembly building include stamped metal members, track shoes, gears and spline shafts. Two endless overhead conveyors carry these parts from the buildings in which they are manufactured to the assembly line, passing from one building to the other through



Transmission cases are milled in a machine with a cutting head 42 in. in diameter, having 70 tungsten-carbide cutting tools.

inclosed runways above the courts between buildings.

In the manufacture of track shoes two heat-treating furnaces of special types are used, and one of the heat-treating operations is of more than ordinary interest. Until recently the company used an alloy casting for the track shoe. This has now been replaced with a one-piece drop forging which is claimed, with proper heat treatment, to have greater resistance to wear than the cast shoe. The company had not used a forged shoe previously, because there were objections to a two-piece shoe and the forming of a forged one-piece shoe of such intricate design was regarded as unusually difficult. However, the shoes are now being successfully produced in a one-piece forging.

This shoe is made of carbon steel, S.A.E. 1045. The shoe assembly includes a carbon steel bushing, a roller made of chrome-nickel steel, both of seamless steel tubing, and a pin of cold-drawn 1½ per cent manganese steel. The track shoes are heat treated in a gas-fired pusher-type furnace built by the Electric Furnace Co. Placed in rows at the loading end, the shoes are pushed over a flat hearth by a motor-driven pusher. The furnace has two zones, a heating zone and a stabilizing temperature zone. Both temperature and time are automatically controlled, the latter by controlling the pusher action. The furnace is run at a temperature of 1480 deg. F. and handles 2000 lb. an hour.

Leaving the discharge end, the shoes pass down a sloping plate and are discharged on to a specially designed slat-conveyor-type quenching tank, so constructed that only the lower portion or rail of the shoe passes through the water and is quenched. This hardening imparts to the rail a wearing surface which has a Brinell hardness ranging from 300 to 450.

From the quenching tank the shoes are carried up an incline. When leaving the quench the unquenched portion of the forging is at a temperature of about 1000 deg. F.—sufficiently high to draw the material when subjected to slow cooling in the air. This treatment imparts toughness and machineability to the portion of the shoe not quenched, these qualities being desired for subsequent drilling and reaming operations. The temperature of the forging has dropped to about 400 deg. by the time it is discharged from the conveyor.

Gas burners at one side of the furnace chamber fire between piers below the hearth. Side burners are used, also, in the heating zone, firing directly into the furnace chamber above the work. This furnace, as well as others subsequently referred to herein, is connected with Leeds & Northrup temperature control and recording instruments.

The water in the quench tank is agitated by high-pressure inlet jets and the overflow goes into a sewer. This provides sufficient circulation to keep the water at a proper temperature.

Bushings, rollers and pins for the track shoe are automatically cut to length, the bushings and rollers are chamfered, bushings are broached on the inside and the pins are turned on the outside. Then the three parts are carburized. This is done in four rotary-retort carburizing furnaces, two electric units built by the Hevi-Duty Electric Co. and two gas furnaces supplied by the American Gas Furnace Co., gas being used for carburizing in all the furnaces.

These furnaces are placed in two rows with a water cooling tank located in the floor between each two furnaces. After being carburized to provide the required depth of case, the work is dumped into wire baskets in the cooling tank. A conveyor takes the baskets to the loading end of a hardening furnace, where they are dumped into containers by tripping the bottom of the basket.

Hardening is done in a pusher-type electric furnace that has a grooved hearth, with nine grooves, the pieces being pushed endwise through the furnace in the grooves by a variable-speed pusher. The furnace has two zones with variable power input. A temperature of 1375 to 1425 deg. is maintained, depending on the type of steel. The furnace handles 800 lb. an hour. It was built by the Electric Furnace Co.

To avoid exposure to the atmosphere, the work is discharged from the furnace through a chute into a quench tank containing a caustic soda solution. A propeller beneath the point of discharge agitates the quenching liquid, which is kept cool by a circulation of city water through the pipes.



The work, carried out from the quenching tank by a conveyor, is discharged into a rinsing tank and then into baskets. From here a conveyor takes the parts to the point of assembly with the shoes, which also after the various operations have been carried to the same point.

Here the shoe units are assembled by placing the roller in position and pressing the bushing into the lower end of the shoe and through the roller under 30-ton hydraulic pressure. From this point one of the overhead endless conveyors carries these shoe assemblies and their pins to the end of the final assembly line, in sufficient number to produce a complete track.

How Each Principal Part Is Handled

Following are listed the principal production departments in the machine shop and assembling building, in the order of their arrangement in adjoining bays, to bring the parts when completed to the point at which they are wanted for assembly, and the method of handling each part of the work in process in the various bays:

Transmission cases, monorail; radiator assembly, gravity conveyors; front and rear wheels and side frames, monorails; lower track wheel shafts, bearings and wheels, gravity conveyors; track frame, air and hand hoist and flat-type conveyor at working height, which takes track-frame sub-assembly to the final assembly line.

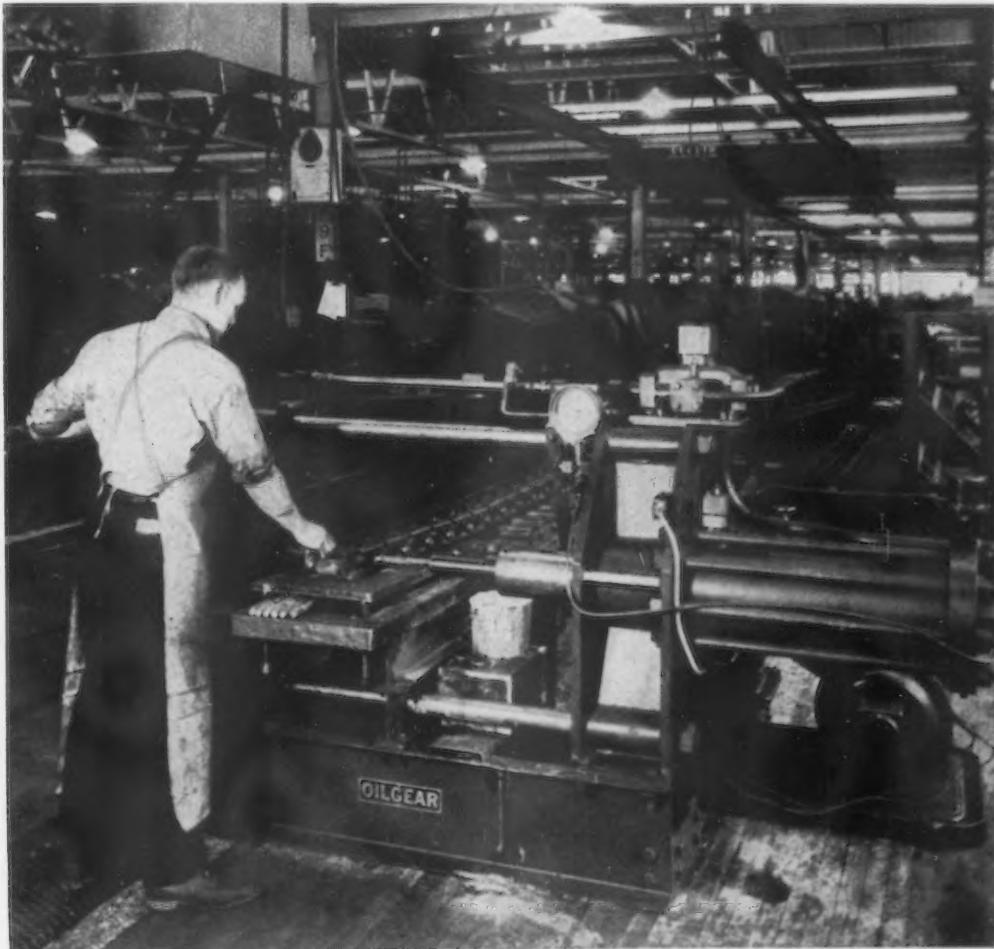


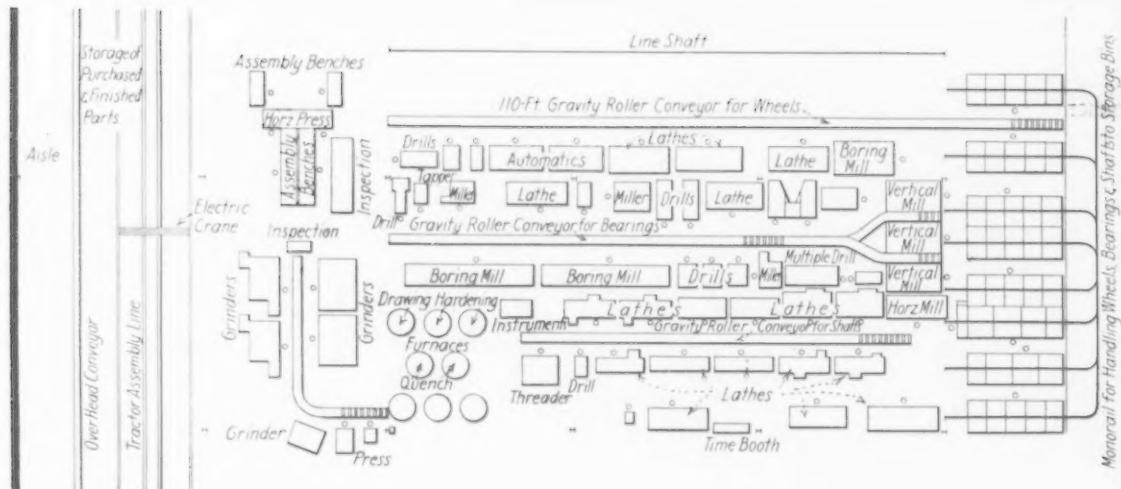
Transmission cases are made of high-strength cast iron. The first operation is dipping in lacquer. Faces of the cases are then milled on a special Newton vertical milling machine with a 42-in. diameter cutting head, in which are set 70 tungsten-carbide cutting tools. The head is driven at 15 r.p.m. A 45-spindle drilling machine is used for drilling holes in the top of the transmission case.

The cases move down six parallel lines for successive operations. This department is served by six interlocking monorails, all leading to a Niagara washing machine at the end of the line. The department is tooled for machining 40 transmission cases in 9 hr.

At the end of the line the transmission cases are set in rotatable jigs for assembling gears, differential

TRACK shoes are brought on an overhead conveyor to the end of the assembly line, where the track is assembled with hydraulic presses, one on each side of the line, for right and left tracks.





L ATHE set-up for machining shafts, wheels and bearings. The whole feeds toward the general assembly line on left. Hardening and drawing furnaces with quench tanks appear in lower center.

steering mechanism and other parts making up the transmission assembly.

Making Track-Rail Shafts

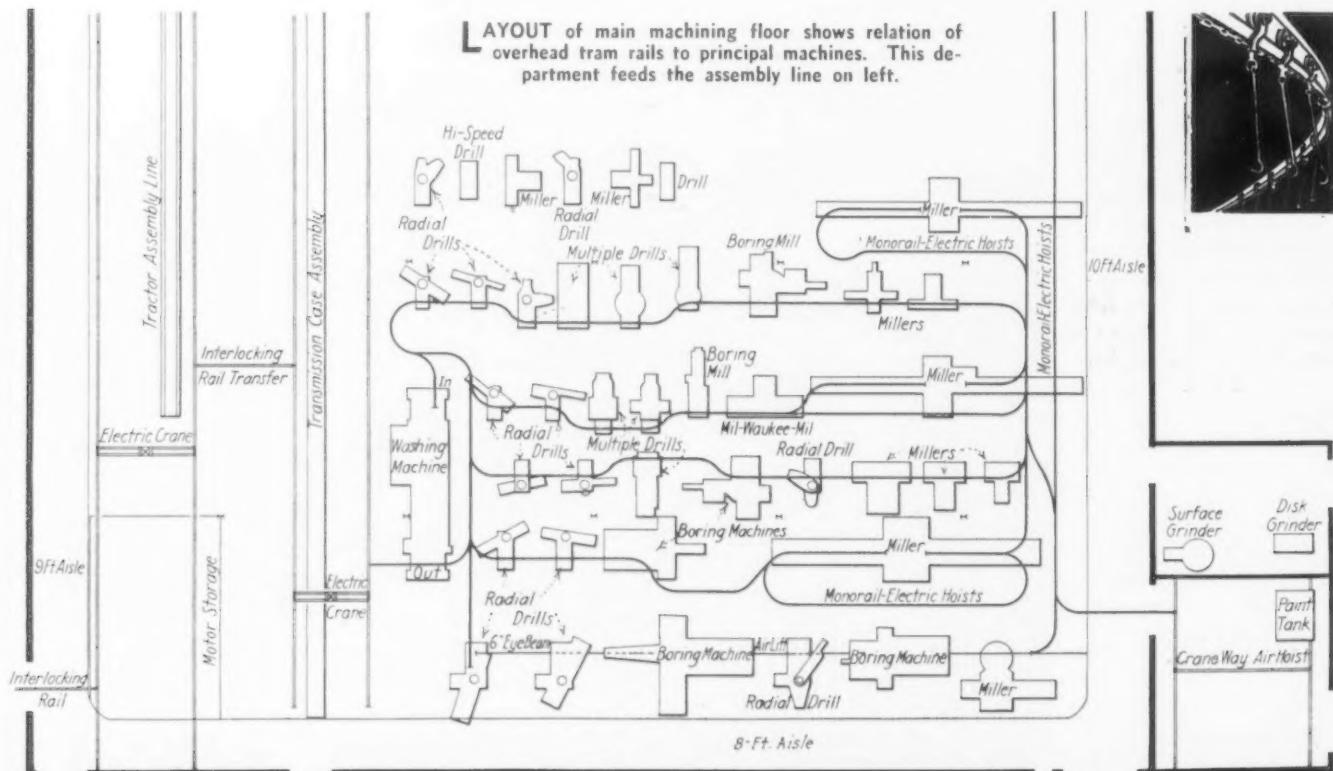
One of the most interesting centralized manufacturing units is that in which the lower track-rail shafts are made. There are eight of these units for each track. The blanks in various sizes are stored in a series of bins at the head of the line. These, purchased outside, are shipped from the forge shop in steel barrels of about 1000 lb. capacity on a truck which dumps the barrels into a series of bins at the head of the line. These bins are served by monorails.

While some material is taken from cars on gravity conveyors, the company has adopted the use of steel barrels as an efficient method of handling shipments of small castings and forgings and other small parts. These containers, when emptied, are shipped back to

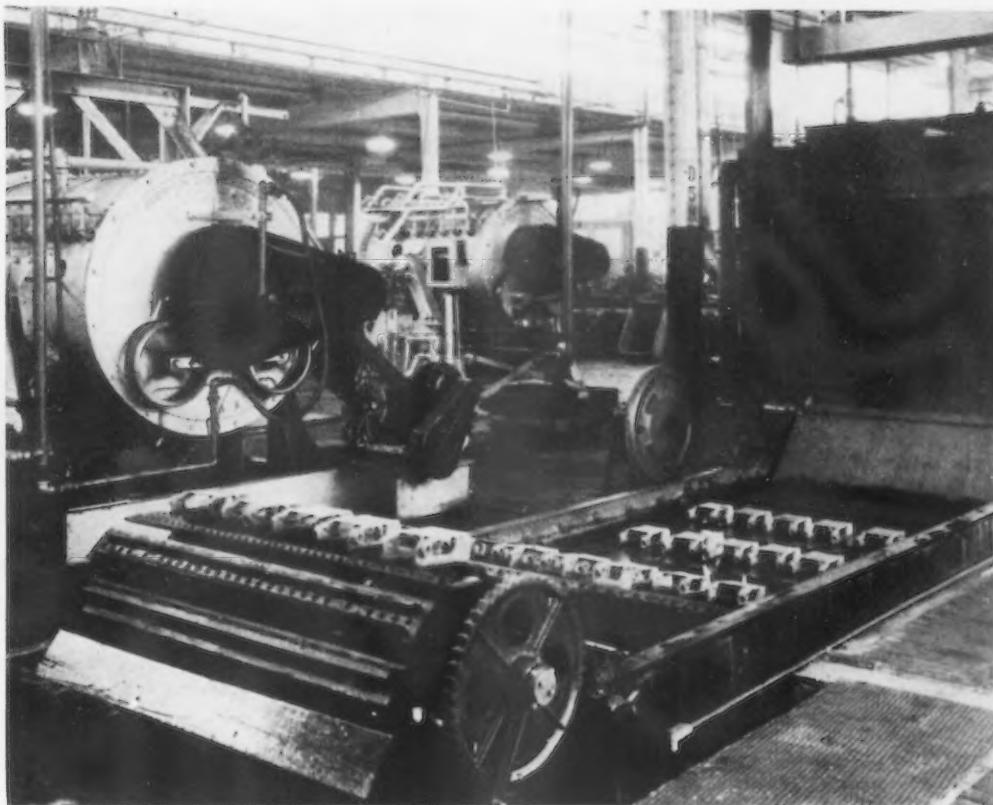
the source of supply. It is stated that the saving in cost of handling in this manner more than compensates for the additional charge of returning the empty barrels.

Forged track-rail shafts are made of plain carbon steel, S.A.E. series 1035. They are moved from one operation to the next on racks, nine to a rack, that move on a roller conveyor, there being one of these conveyors for each of the three parts. When unloaded, the racks are placed on a gravity return roller conveyor which takes them back to their starting point. The racks are so constructed that they may be tiered if desired.

After machining, the shafts are hardened to a Brinell hardness of 325 to 375 in a 35-kw. pit-type Hevi-Duty electric furnace. There are two of these furnaces, rather unusual in their construction. The work is hung on a spider on which it revolves slowly,



▲ ▲ ▲
UNIQUE method of hardening track shoes. To provide a hard wearing surface for the rail of the shoe, only this side is quenched. The part of the shoe not immersed in the quenching solution remains at sufficiently high temperature to temper it in the air while on the conveyor, imparting desired toughness and machineability. Rotary carburizing furnaces for other parts of the shoe assembly are shown in the background.
▼ ▼ ▼



the heating elements being located both on the wall and on a central pier. The spider is driven by a motor mounted on the furnace cover. To maintain an even temperature throughout the furnace chamber, there are two zones of control, an initial and a final zone. These furnaces are operated at a production rate of 130 lb. an hour.

After heating, the shafts are quenched in a caustic soda solution and then drawn in a Homo electric furnace. Following a 100 per cent inspection for hardness, they are moved on a roller conveyor to the final grinding operation. In the adjoining two production

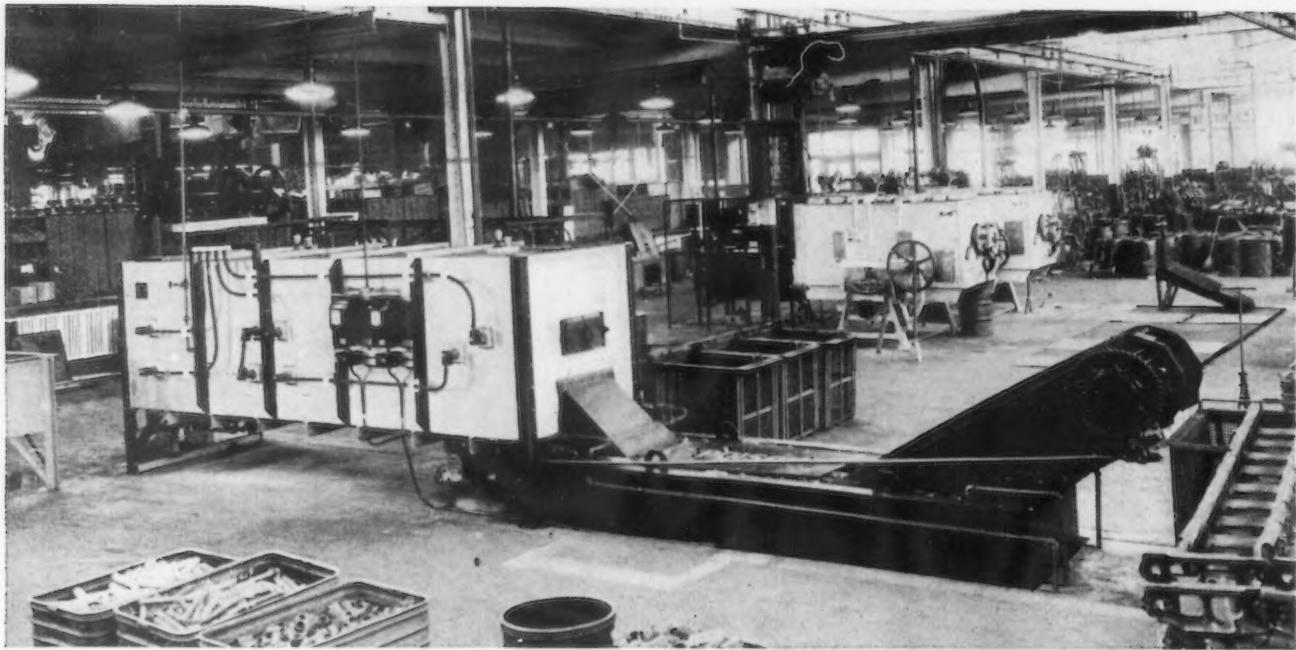
units cast iron bearings used for the track-rail shafts and the lower track wheels are machined. Then the shaft is assembled in the bearings and the wheels are assembled on the ends of the shafts, after which the sub-assembly is completed and is ready to go on the main assembly.

Main Assembly on Line 320 Ft. Long

LOCATED near the outer wall and at right angles to the various production units, the final assembly line is 320 ft. long. It has an adjustable-speed conveyor with a speed range of 6 to 18 ft. a minute and

▲ ▲ ▲
TRACK rail shafts are heat treated in pit-type electric furnaces located in the production line. After hardening in one of the two furnaces at the right, they are quenched in the tanks in the foreground and drawn in the furnace at the left. The hardening furnaces carry the work on spiders, rotated by the motors shown on top.
▼ ▼ ▼





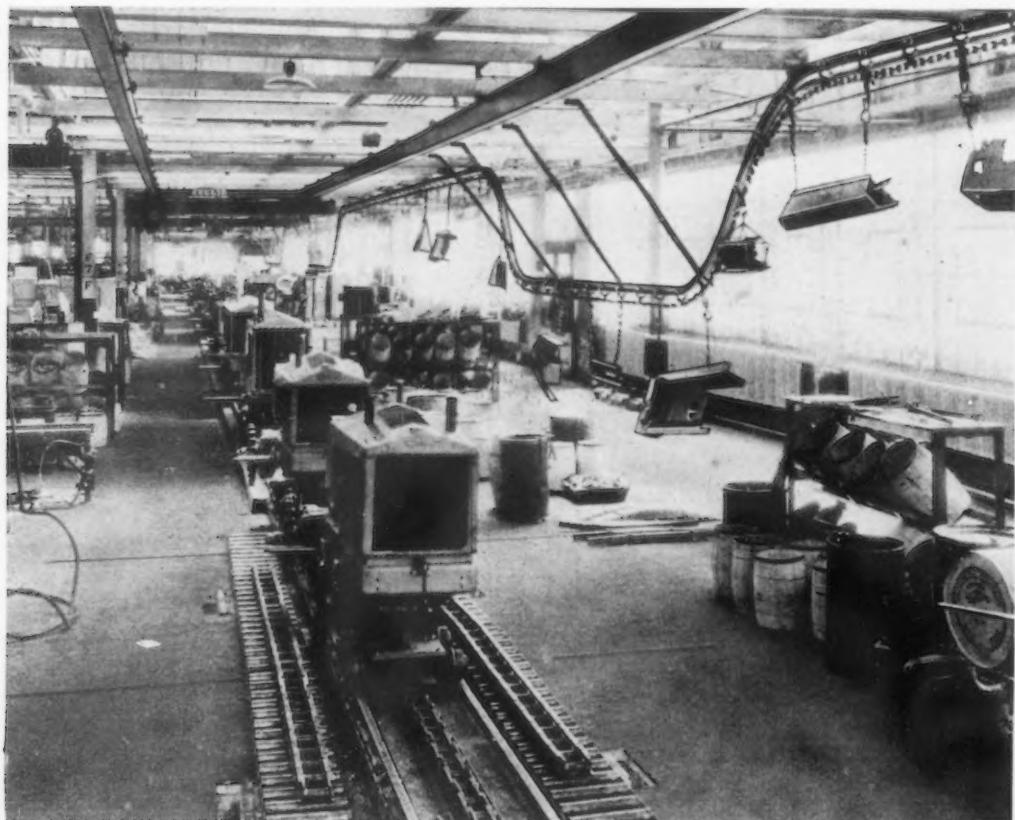
BUSHINGS, rollers and pins for track shoes are hardened in a pusher-type electric furnace having a hearth with nine grooves, along which the work, placed lengthwise, is pushed, and from which it is discharged through a quenching tank and thence into tote boxes.

is laid out for the assembly of 40 tractors in 8 hr. Assembling is done on a 4-wheel dolly running on a track with a 24-in. gage, that contacts with a conveyor chain between the rails by means of an adjustable dog.

Motors, manufactured outside, are delivered at the front end of the assembly line and stored on roller-type racks. From here they are delivered to the assembly line by an overhead crane. Parallel to this, and

connected by transfer, is another crane for handling completed transmissions to the assembly line. Each of these cranes has five hoists.

After the main frame is set on the dolly, the motor and transmission are set on the frame. Then as the dolly moves along the conveyor the other parts are added. Various small parts used in assembling are stored in kegs and boxes along the outer side of the assembly line, opposite points where they are to



ASSEMBLY line, showing in front the point of final assembly operation, which is placing the track on the tractor. The track moves from the assembly press at the end of the line (from where this view was made) over the roller conveyors to where it is put on the tractor. One of the overhead conveyors feeding work to the assembly line appears at the right. Various machine departments through which the work moves progressively to the assembly line are in the bays at left.

be used. The assembly line is served its entire length by four Euclid cranes of 1-ton and 2-ton capacity and 12-ft. span, equipped with seven hoists. These transfer parts and sub-assemblies from the side of the line to the assembly line.

Reference was made previously to two endless overhead conveyors bringing parts from other buildings to the assembly line. One of these, 1495 ft. long, has two loading stations. The first is for receiving track shoes. From this station the conveyor passes through the sheet-metal department, where it picks up frames, hoods, fenders and other sheet-metal parts. It passes around the end and along one side of the final assembly conveyor, where there are seven unloading stations.

The second continuous conveyor line, 1490 ft. long, passing along the other side of the final assembly line, is for gears and spline shafts. It has two loading points and four stations for both loading and unloading. At the various loading and unloading stations both conveyors dip down to a height above the floor convenient for handling pieces to and from the conveyor. The movement of these two overhead conveyors alongside the assembly line is in a direction opposite that of the assembly line.

The track, which is the last part to be assembled to the tractor, is made by joining the track shoes near

the point where the track is put on the tractor, or at the end of the assembly line. The track is assembled by driving in the shoe pins joining the shoes together. This is done by hydraulic press, one machine on each side of the line for the right and left tracks respectively.

From the press the track is fed on to a roller conveyor about 20 ft. long to points on each side, under the side-frame assembly. The ends of the track are brought around the wheels with an overhead crane and the final pin that joins the two ends of the track is driven in by an overhead press.

After the track is in place the tractor becomes disengaged from the dolly on which it is mounted on the assembly line and settles down on its track on to a short section of plate-type power-driven conveyor. The dolly becomes disengaged from the endless conveyor chain, dropping by gravity below the floor. Here it automatically again becomes attached to the chain conveyor and is carried back beneath the floor to the starting end of the assembly line.

Served with gas and water from above, the motor is started and the tractor leaves the assembly line under its own power. Then it is thoroughly tested at all speeds, adjustments are made over pits, the bearings are lubricated and the painting is touched up, after which the machine is ready for shipment.

▲ ▲ ▲



All-Welded Hopper Cars of 70 Tons

FIVE 70-ton cars recently built by the Pullman Car & Mfg. Corp. for the Chicago Great Western Railroad have been welded throughout their structure, with a substantial saving in weight. These cars are described in some detail in the May 9 issue of *Railway Age*. The five cars were part of an order for 300 cars, the others having been constructed in the customary manner. (See page 1279, THE IRON AGE, April 16, for a Baltimore & Ohio welded hopper car.)

These 70-ton cars show a complete weight of 45,900 lb., which is roughly the same as 50-ton cars of riveted construction. This means the ability to carry 20 additional tons of coal in each car, with no addition to the tare weight. The table shows a number of 70-ton cars built for seven or eight railroads. In all cases the light weight of the riveted car is much greater than that of this welded car, and the cubic capacity for cargo is less. Difference in weight runs all the way from 4300 lb. (9.4 per cent) to 10,500 lb. (23 per cent).

Approximately 1500 linear feet of welding was done. About 200 lb. of welding rod was used, 56 per cent having been deposited by the oxyacetylene process

and 44 per cent by the electric arc. The latter process was used for the side sheet construction, all upper end construction and the dump doors. The oxyacetylene process was used for the center sill and all attaching parts, the body bolster and attachments, including side and floor sheets, and practically all of the under parts.

Each car was given a test load of 105 net tons, or 50 per cent more than the light load, and 23 tons more than the maximum permissible running load. Careful examination of joints give no indication of the flaking off of a cement wash which had been put on to give indication of structural movement. Working of joints or plates was not enough to cause any trouble.

Typical 70-Ton Hopper Cars of Recent Design

Railroad	Light Weight	Cubic Capacity	
		Level Full	10-In. Heap
New York Central	50,200 lb.	2,620 cu. ft.	2,948 cu. ft.
Lackawanna	50,800	2,755	3,062
Norfolk & Western.....	51,500	2,439	2,729
Chicago Great Western..	52,675	2,778	3,100
St. Paul.....	52,800	2,778	3,100
Chicago & North Western	54,900	2,590	2,900
Illinois Central.....	56,400	2,778	3,000
All-welded, for Chicago Great Western.....	45,900	2,863	3,197



OPEN-HEARTH FURNACE CONTROL

By MARTIN J. CONWAY

Fuel engineer, Lukens Steel Co., Coatesville, Pa.

WHEN we consider that fuels and the air for their combustion are the most important raw materials, both in weight and value, consumed in the manufacture of heavy steel products, there should be no need for an apology for attempting to add to our knowledge of the economies of the process. A common steel billet, during its manufacture from ore to steel, has had expended upon it the energy of some two tons of fuel. And 20 tons of air, much of which has been used at a pressure of 15 lb. to the square inch and preheated to a temperature of from 900 to 2500 deg. F., has been used for combustion.

Over 200 kwhr. has been used in driving the mills and transporting the product during its many stages of manufacture, and 30 per cent of the cost of production is accounted for in heat and power requirements alone.

This cost of fuel in steel manufacture is so large in proportion to the total cost of production that efforts are being made in every direction to secure economies in fuel utilization, resulting in the successful application of scientific control to the heating and melting operations.

Proportions and Temperatures Both Are Vital

Control of open-hearth furnace operation may be considered in two separate and distinct phases. One phase of the problem is concerned with the proper regulation of fuel and air mixtures and with the maintenance of correct draft conditions in the furnace. The second phase of the problem is concerned with the maintenance of correct temperature conditions at the hearth and in the checkerwork.

Combustion engineers are interested mainly in the problem of obtaining the required heat input to the furnace with a minimum consumption of fuel. The operating man, on the other hand, is concerned chiefly with tonnage, and with the proper regulation of furnace and checkerwork temperatures to maintain production at a peak.

Methods of Furnace Control

Several methods of furnace control have been evolved during recent years having several or all of the following features:

Proportioning of Fuel and Air Supply

Fuel measurement as means of air supply control.

Maintaining constant pressures of fuel and air, regardless of quantities being used.

Maintaining constant fuel and steam temperatures.

Mixing of fuels to maintain predetermined quantitative B.t.u. input.

Checker Temperature Control

Automatic reversal through pyrometric control by time interval, predetermined high, low, or differential temperature limits; and hand reversal warned by signal lights or alarms, pyrometrically controlled by the limits mentioned.

Stack Draft Control

Exit gas fan speed or stack damper.

Changing weight of stack gas by addition of atmospheric air.

Requirements of Furnace Controls

Requirements of open-hearth furnace controls are approximately as follows:

1. A control of air supply that will provide a minimum excess at all rates of fuel B.t.u. input, and having flexibility to provide either a reducing or an oxidizing atmosphere at will of operator.
2. Reversal control that gives the combustion air the highest possible preheat, consistent with checker design and physical characteristics of the refractory with which both the preheated air and combustion gases are in contact.
3. Stack draft control which allows a minimum amount of air infiltration, the maximum transfer of heat from the flame and gases of combustion to the bath and maintaining the necessary velocities through the slag pockets and checkers, all consistent with the design of the particular furnace so controlled.

The forces available under these temperature conditions within the furnace system are:

1. Buoyancy or stack effect of the air entering through the air inlet valve and being forced to the port outlet on account of being preheated.
2. Gas pressure produced by producer for the delivery of the gas from the producers to the port of the furnace.
3. Stack draft for the handling of waste gases from

the outgoing port end of the furnace to the atmosphere through the stack.

Buoyancy of preheated air is fixed by furnace design and the temperature of the air. In a furnace studied this works out at 0.279 in. of water pressure.

Producer Gas Pressure

Considering that high producer pressure is usually associated with a hot and lean producer gas, whereas, a cooler and richer gas is much preferable for efficient practice, it was considered essential to eliminate from the gas passage all unnecessary obstruction, and to recommend straight flue valves at the risk of occasional leakage, which is less objectionable than a constant pressure loss, inherently connected with overground valves of the water-cooled mushroom type.

Gas energy requirements were found, on analysis, to be 0.862 in. of water pressure for the furnace studied. Of this 0.279 in. was available from the preheated air, leaving a pressure of 0.573 in. of water to be supplied by the producer, plus the necessary energy to deliver the gas to the gas main.

Waste gas movement: We had a combined port area of 16.24 sq. ft. available for the removal of the gases from the hearth. The energy requirements to create a velocity head of 102 ft. a second through this area, 14 sq. ft. of which was assumed effective, was calculated at 1.097 in. of water pressure. Available stack draft was determined as 1.454 in., leaving a balance of available draft over actual requirements of 0.357 in.

Practice at Lukens Plant

Checker temperature control: At present we are reversing by hand, using as a guide the readings from recording pyrometers of the duplex type, recording the temperatures in both the air and gas checkers. As we have slide damper valves, we can readily adjust the flow of gases to balance up the individual chambers when they differ.

Much can be said in favor of checker temperature control, but we have not yet completely worked out mechanism which would suit our purpose.

The savings accruing from the use of this control are as set out in the table. The figures are all based on gross tons of ingots, and included in the computation are all of the incidentals consequent to open-hearth operation, such as stock and bottom delays, minor mechanical and brickwork repairs, etc.

With proportionate supply of air to fuel established, air infiltration must be prevented or at least be brought down to a minimum. This can be taken care of partially by machine regulation of the stack damper or induced-draft fan. By

keeping the center of the furnace as close to neutral as possible, cold air infiltration on the incoming end will be prevented and peak flame temperature prevail. Air infiltration on the outgoing end will be minimized and the gases of combustion relieved of the ballast which they usually carry where pressure control is not in use.



▲ ▲ ▲

ANY type of open-hearth furnace control which will work will provide savings in cost, according to a paper read and discussed at Cleveland, on June 17, before the combustion group of the Association of Iron and Steel Electrical Engineers. In this paper, which is abstracted here, many of the matters connected with the application of this control are brought out in definite form, and some of the results of calculation are given, showing the pressures necessary in overcoming resistance to the flow of gases through the system.

▼ ▼ ▼

Selection of the point from which this pressure is to be controlled is very important. In our early experiments we made connections in rear center of the roof, at two points in the backwall and at two points in the ports and downtakes. We eventually decided on the frontwall as close to the center as possible. While this point has proved most successful, we are not ready to say that we have the correct final location.

Furnace control, entirely or in part, for the open-hearth furnace is a problem of the application of well-known principles of regulation to suit individual furnace requirements. It calls for the complete co-operation of furnace operators and intelligent research of the various departmental superintendents concerned, if it is to be successful in application.

Discussion on Open-Hearth Furnace Control

THE author, in making a brief abstract instead of reading his paper, expressed the opinion that these regulatory devices will result in such considerable saving in the use of refractories that, within the next ten years, we will find ourselves able to get along with 40 per cent less of refractory brick for maintenance. There will be less oxidation of the brick and a much longer life. He believes that suspended roofs are here to stay.

Mixing of different fuels in the open-hearth port is not yet at a point which can be considered final. This mixing must be done in a more definite manner if we are to obtain from it the desired results.

Equipment Must Be Constantly Reliable

Reliability of operation of the equipment used for furnace control is the cardinal requirement, according to Joseph F. Shadgen, Smoot Engineering Co., New York. Unless this equipment is of a character which will function adequately every day, every hour, every minute, confidence in it will be destroyed and progress will be impossible. Stating that no two plants are alike in the intimate character of their problems, the

(Concluded on page 278)

SPECIALTY FOUNDRY FOR

BUILT primarily as a source for its own alloy steel castings, the new alloy steel foundry of the Duriron Co., Dayton, Ohio, possesses some unusual features. This article describes a typical charge for the high-frequency induction furnaces, what kind of sand is used and how tests are made of each heat in the company's laboratory. Concerned principally with producing corrosion-resistant and heat-resistant alloy steel castings, this foundry looks upon each job as a separate engineering problem.

FOR the production of its special brands and other types of alloy steel castings, the Duriron Co., Dayton, Ohio, recently put into operation a new foundry equipped with two Ajax Northrup high-frequency induction furnaces. Although the new unit does a jobbing business, it was built by the company primarily as a source for its own alloy steel castings.

Special Charges for Electric Induction Furnaces

The induction furnaces each have a capacity of 650 lb. and are operated by a 150-hp., 2300-volt induction motor which is connected to a 150-kw., 900-volt, 900-cycle generator. The procedure in making up a charge of Nirosta Ka2-MO(Ka4) and melting the steel is of special interest. First 180 lb. of low carbon steel scrap and 35 lb. of electrolytic nickel are melted down and held for 15 min. in order to burn out the carbon. Next 19 lb. of special molybdenum iron alloy, high in silicon, is added (this would kill the

heat if used before the carbon had burned to a low limit). Then follows 3½ lb. of silico-manganese and 6¾ lb. of 85 per cent ferrosilicon, the former being added first in order to furnish sufficient oxide of manganese to flux any oxide of silicon formed on the addition of ferrosilicon.

Low-carbon scrap, to the extent of 350 lb., is the next material to go into the mixture, after which 105 lb. of 0.05 per cent carbon ferrochrome is charged. Just before the heat is poured, carbide-free ferrotitanium is thrown in. The melting-down process is completed in the first hour and a quarter and the refining and superheating in the final half hour. The steel is tapped out at about 3250 deg. F. Incidentally, the regular grade of ferromolybdenum is not used in the charge, because it has an appreciable carbon content.

The alloy steel castings produced by the foundry have a carbon content of less than 0.07 per cent. This is desirable because the company's primary purpose is

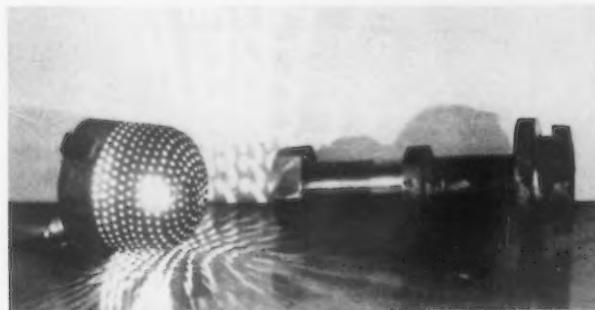


NEW alloy steel foundry.



ELECTRIC ALLOY STEEL CASTINGS

By BURNHAM FINNEY



Special alloy strainer has over 400 drilled holes.

to make all products fully corrosion-resistant; each unit of carbon takes to itself 16 times its weight in chromium in the form of chromium carbide, which is valueless so far as corrosion resistance is concerned. It is interesting to note that the company's alloy Durimet is resistant to sulphuric acid in pickling solutions as well as to conditions met by the 18-8 type of alloys.

It should be remembered that all high nickel-chrome castings present more problems than plain carbon steel. Steel with a high alloy content, especially chrome and silicon, has a high affinity for oxygen, this tendency contributing to sluggishness of the molten metal and making the feeding of castings more diffi-

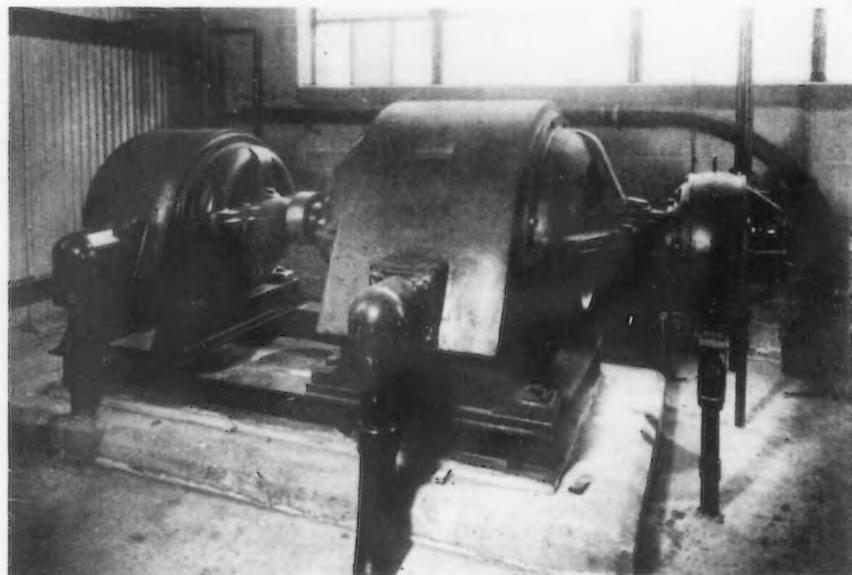
cult. Moreover, low heat conductivity and high shrinkage make it virtually impossible to produce certain designs. The difficulties are overcome to some extent by the use of extra large gates and risers.

How the Sand Problem is Solved

Eighty per cent of the castings are manufactured by the dry sand process. In some cases molds are baked in ovens and in other instances are dried to a depth of 1 in. by charcoal or a torch. Facing sand is 40 to 65 mesh Ottawa silica sand bonded with bentonite and a cereal binder. The average permeability of the facing is 120 with 3 per cent moisture and green shear strength of 2. The heap sand permeability is

INTERIOR of foundry, showing core ovens in background.





MOTOR generator connected to 150 hp. induction motor supplies current for two high-frequency induction furnaces.

about 175 with 2.5 per cent moisture and 1.7 shear strength. These specifications apply to the general commercial run of corrosion-resisting castings weighing from 5 to 500 lb. However, in cases where an unblemished surface is important, a slight amount of French or statuary sand is added. In dry sand molding all the molds are sprayed with molasses water and silica flour before drying.

All gates and risers are removed from castings by means of a 500-amp. arc cut-off machine. All grinding and snagging are done with high-speed grinding equipment having special rubber-bonded wheels. The foundry has pressure testing apparatus to test castings of any shape or weight.

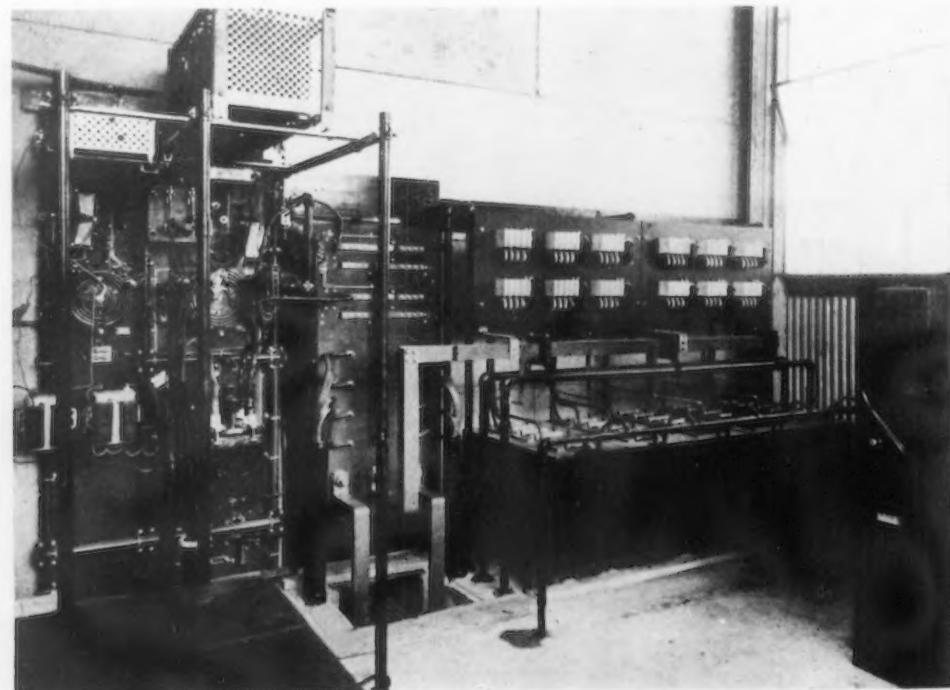
From each heat a complete chemical analysis and tests for machineability and depreciation are made in the research and chemical laboratory. The depreci-

ation test consists of submerging the sample in the corrosive against which the particular alloy is intended to show the greatest resistance, such as nitric acid for Ka2-s, 50 per cent acetic acid for Ka4, and dilute sulphuric acid for Durimet. Two depreciation oil baths are used for samples placed in a solution agitated by glass paddles and aerated baths, the latter insuring a condition of oxygen saturation. The temperatures are controlled automatically. Reflux condensers prevent evaporation and maintain a constant solution concentration.

Use Made of an Experimental Foundry

An experimental foundry, equipped to make heats of any composition in the form of sand castings or ingots cast in iron molds, is located in one section of the laboratory building. Here a 35 kva. high-fre-

BACK of control board in motor generator room for high-frequency induction furnaces.



POURING a heat from a high-frequency induction furnace.



quency induction furnace will melt and bring to pouring temperature 10 to 15 lb. of metal in from 40 to 60 min.

Other equipment in the laboratory includes two carbon trains for the determination of carbon in Duriron and alloys, two Hoskins heavy-duty combustion furnaces with the temperature controlled by a thermoelectric pyrometer, a Freas electric oven for drying precipitates, a small heavy-duty Hoskins muffle furnace and a standard Kelvin double bridge for checking the silicon content of Duriron.

The company regards each alloy steel casting as a separate engineering problem. When a difficult casting job is received, unless it is known that the design is suitable to high alloy steel production, the cooper-

ation of the customer is invited concerning possible changes in design which will prove advantageous. If a new design is made, either for the company's own use or for the jobbing trade, castings taken out of production are cut in sections with an abrasive wheel $\frac{1}{8}$ in. thick so that any hidden flaws or defects can be detected. About half of the foundry's output goes into finished products, such as Y valves and pumps, of the Duriron Co. and the other half is sold in fields where corrosion-resistance and heat-resistance are the paramount considerations. The company solicits business on the basis of castings completely machined rather than "in the rough," feeling that its equipment and experience in machining these difficult alloys will give the customer a more satisfactory product.

Action of Widia Cutting Tools Studied by High-Speed Photography

A DETAILED study of the processes occurring when a simple disk of metal is turned in a lathe using a Widia cutter of width equal to the thickness of the disk has been undertaken by F. Schwerd (*Stahl und Eisen*, April 16, 1931) by means of a camera capable of making ten $1/1,000,000$ second exposures in one one-thousandth of a second. Most of the tests were made on an open-hearth steel of 114 Brinell hardness and 58,000 lb. per sq. in. tensile strength, having the composition: 0.155 per cent C, 0.056 per cent Si, 0.74 per cent Mn, 0.06 per cent P, 0.07 per cent S. The cutting edge was parallel to the axis of the work so that the shavings came off in a plane perpendicular to the axis and the edge.

At the slower speeds on the tougher materials, appendages were observed to form on the cutting edge which caused roughening of the machined surface. Each appendage was observed to build up gradually and then to split, part adhering to the work and part to the shaving, while another accretion commenced to form on the edge, the whole development occurring in a fraction of a second.

With this type of cutting, the outer surface of the work is distorted to a depth equal to about half the

depth of cut. At slow speeds surface distortion was produced by cuts as low as 0.002 in. The surface of brittle materials, such as cast iron and cast aluminum, was distorted without the development of the accretions on the tool.

Numerous photographs taken at a tenfold magnification indicate the increased tendency to form flow chips as the cutting angle is reduced. Chip thickness and the effect of high speed in improving the surface of the work are shown, as well as the elongation of the grain as chips are formed.

The Facts About Pittsburgh's Soot and Dust is the title of a pamphlet published under the authorship of H. B. Meller, chief of the bureau of smoke regulation of Pittsburgh, by the Mellon Institute of Industrial Research of the University of Pittsburgh. The monograph points out the lack of restriction by ordinance of the discharge from stacks of fuel dust and ash, apart from smoke, and also the lack of control of deleterious gases, including the pollution of air by automobiles.

STRAIN-HARDENING OF



METALS must be more or less plastic to be able to undergo press-working operations. Zay Jeffries has defined plasticity as "the quality by virtue of which a substance may undergo a permanent *change in shape without rupture*." Plastic properties vary both with temperature and with the particular metal.

In cold-working plasticity is reduced by the operation, to an extent which depends both upon the severity of the deformation or amount of cold-working, and upon the rate at which such cold-working strain-hard-

width to suit a similar reduction in circumference from the original blank. As volume remains constant, the original square must increase in length and thickness to compensate for the decrease in its width. Such details of the metal movement will be discussed more thoroughly later.

Throughout industry many instances will be found in which the metal must traverse the plastic cycle several times during its fabrication. Thus, in producing an extruded cartridge case:

Cold-rolling to final thickness strain-hardens the



FIG. 1. Marked blanks of steel, drawn to different depths to show the progress of the metal movement.

ens the metal. The removal of the resultant strain-hardening may be accomplished by annealing or recrystallization. This restoration of the metal to its original state completes what might be referred to as "the plastic cycle."

The strain-hardening properties of metals have been discussed to some extent in connection with shearing and bending operations. They are even more vital to a proper appreciation of the drawing and squeezing groups of operations which follow. Fig. 1 shows a group of shells drawn to different depths from marked blanks, to illustrate the manner in which the metal is moved about and the extent of the movement in a single operation.

Five of the blanks were ruled with squares. A sixth was marked with radial lines spreading from its center. When this blank was drawn up it may be seen that the lines became parallel in the side wall of the shell.

On the squared blanks one series of squares was marked off with two dark lines. These lines remain parallel on the flange but with less and less space between them as the shell becomes deeper. In the finished side wall they taper gradually until the square at the top has been reduced perhaps 45 per cent in

metal, recrystallization (annealing) renders it plastic again, blanking and drawing the cup causes strain-hardening, recrystallization restores plasticity, extrusion (and trimming) causes severe strain-hardening, recrystallization is limited to produce semi-hard wall structure, coining the primer recess and rim strain-hardens the bottom, local recrystallization may be required. The foregoing list of operations is not complete or universal, but it illustrates different operations producing essentially the same effect, and suggests the importance of strain-hardening concepts in the plastic working of metals.

Experiments in Strain-Hardening

To demonstrate certain ideas regarding the changes in physical properties of plastic metals subjected to cold-working, a series of experiments was performed upon a sample of Tobin bronze rod. These were described in the present author's paper, "Metal Working in Power Presses," read before the American Institute of Mining and Metallurgical Engineers, last February.

The recorded test curves, such as one shown in Fig. 2, which was the original for Fig. 3, were drawn on an Olsen recording testing machine. Tensile specimens

PLASTIC METALS

By E. V. CRANE

Staff Engineer, E. W. Bliss Co., Brooklyn

PLASTICITY of metals is essential as a prerequisite for press operations. How this is affected by repeated working cold is brought out in this paper. This is the first of four sections of the article. Successive strain-hardening, followed by softening under annealing, and thus working back and forth between a hard condition and a soft, is carefully explained.

were turned up to standard specifications, with 0.505 in. body diameter. Compression specimens were approximately 0.702 in. diameter by 0.645 in. high. Annealing was performed in an electric furnace at 1100 deg. F. for $\frac{1}{2}$ hr., with cooling in the furnace. Brinell hardness numbers ranged about 132 as received, 95 annealed and 185 maximum reached in tests.

It was desired to demonstrate that the same amount of cold-working would strain-harden the same metal to the same extent, whether the metal started out in an annealed state or not, and whether the work performed was tensile or compressive in nature.

In such a case a curve can be established for any given metal, at any given temperature (as normal room or shop temperature), to be known as its "rate of strain-hardening" curve. This curve must show the change in resistance offered by the metal to deformation, as compared with the amount of deformation. The coordinates used are laid out with pounds to the square inch as a measure of resistance on one

coordinate, and per cent reduction in height or thickness or area on the other.

Fig. 3 shows the first of the reworked experimental curves. The original curve, Fig. 2, as recorded by the testing machine, showed the total pressure or resistance in pounds plotted against compression in inches. Change of height in inches was easily changed to per cent reduction from the original height. But as the slug or blank was squeezed shorter its cross-sectional area increased, giving an unduly rapid rise to the curve. Therefore the approximate cross-sectional area was computed for each step by dividing the volume of the slug by its measured height.

A similar process was applied to reworking or correcting the compression test curves in Fig. 4. Curves 3 and 5, as recorded, show pressures in pounds. Corrected, they show unit stress in pounds to the square inch. Curve 3 was an annealed sample. Curve 5 was the cold-drawn rod as received. Curve 3 was run continuously without interruption. Curve 1 (Fig. 3) was run intermittently, in easy stages, yet the outlines of the two recorded curves (1 and 3) were almost identical.

The step-by-step test in Fig. 3 was designed particularly to illustrate the progressively increasing yield point. At each new stage of compression the stress rises elastically to the last high point. There strain-hardening is resumed and the new test result follows the outline of the plastic working curve.

Each successive operation strain-hardened the metal further, beyond the point where the last one left off, until the resistance offered by the metal rose to about 115,000 lb. to the square inch. This was approaching the *actual* ultimate tensile strength (Table I) for this material, so that internal fractures might properly be expected. Accordingly the sample was reannealed and the yield point fell again below 30,000 lb. to the square inch, indicating restoration of plasticity. The compression test was then resumed, with results similar to those obtained in the first series. There was one difference, however. The plastic curve rose more steeply, because the slug was now much thinner in proportion to its height than before.

To obtain an origin for the "rate of strain-hard-

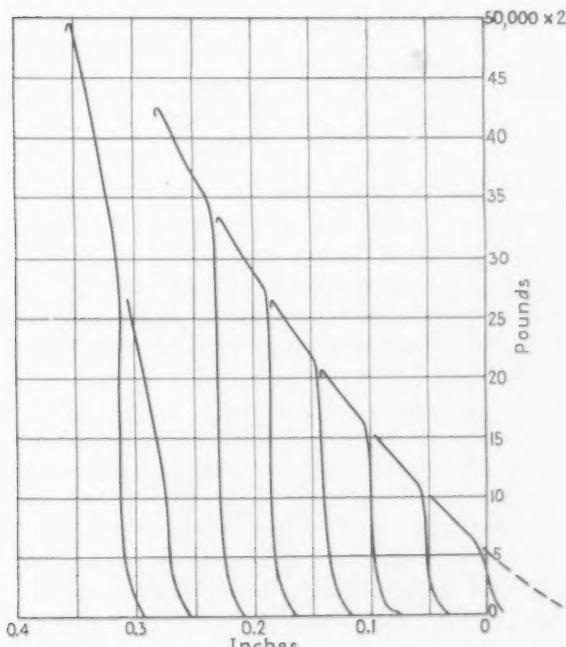


Fig. 2. Step-by-step compression test of Tobin bronze, as recorded in an Olsen testing machine.

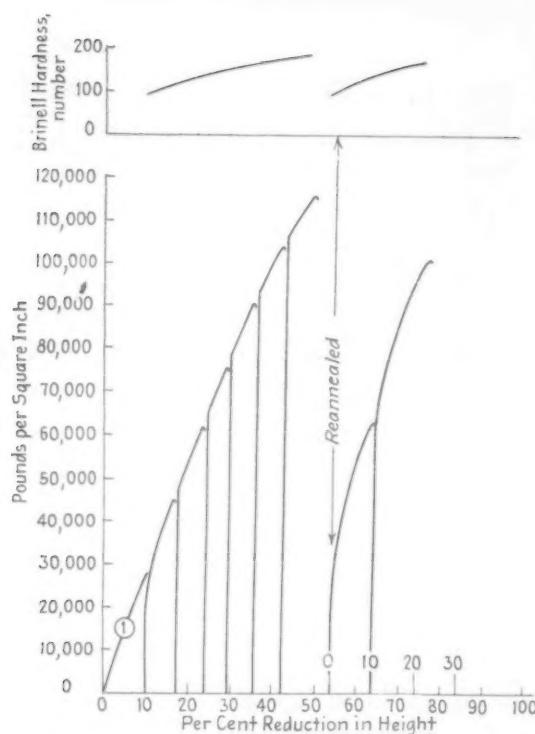


Fig. 3. Progressively increasing yield point and rising hardness as the metal (Tobin bronze) is cold-worked in compression, then reannealed and cold-worked again (From Fig. 2).

ening" curve, or plastic working curve, which would be independent of the degree of recrystallization obtained, the straight portion of the plastic working curve (as corrected to unit stress) was continued down to the zero yield point line. See also Fig. 2. The per cent reduction readings were then corrected to bring this zero yield point to the origin, as shown in Fig. 3.

The relation of *unit* stresses and of relative movements in opposite directions, that is, in tension and compression, is of extreme importance to this argu-

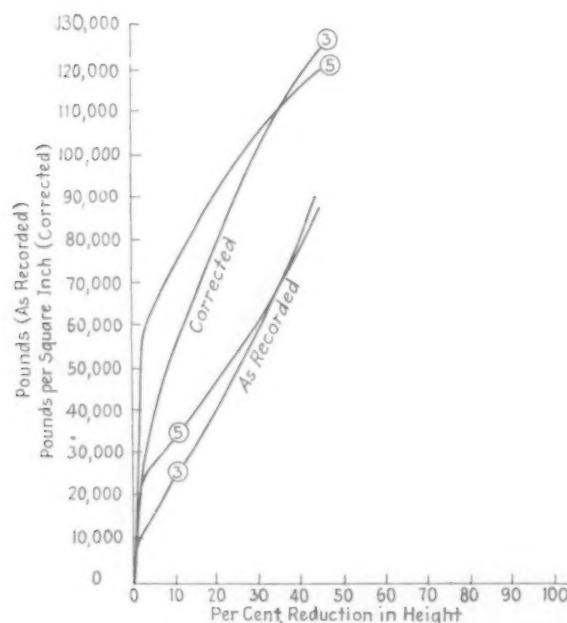


Fig. 4. Recorded compression test curves for annealed (3), and approximately quarter-hard (5) Tobin bronze, then recalculated to show actual unit stress.

ment. On the individual slip plane, recrystallization establishes an unstrained or equilibrium condition. A distortion or slip in either direction from this position might properly be expected to meet with identical resistance, so far as the individual crystal is concerned.

Change in the length of a rod between 5 and 4 in. might be described either as 25 per cent elongation or 20 per cent reduction, depending upon direction. Assuming an identical uniform and unstrained structure in each case, the initial yield point or *unit* stress to start movement in either direction should result in a common, though higher, *unit* stress at the end of the movement. *Unit* stress, pounds to the square inch, is emphasized, for the obvious reason that tensile movement decreases the cross-sectional area and thereby tends to decrease the total stress. Similarly, compressive movement increases the sectional area and

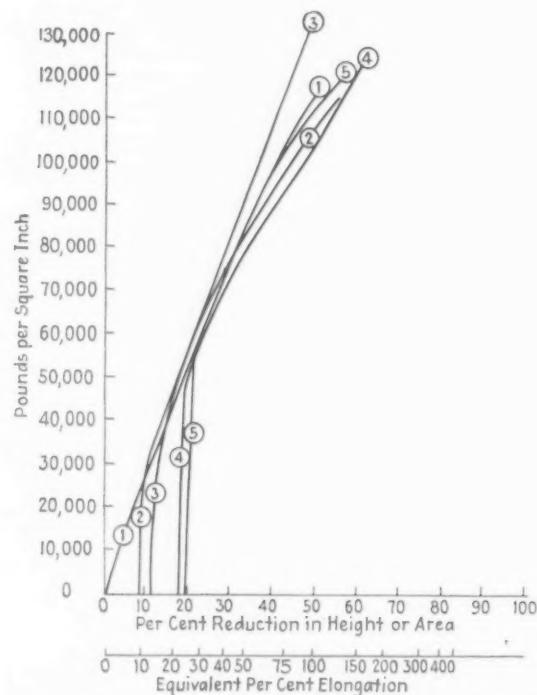


Fig. 5. Assembly of compression and tension tests of annealed and unannealed Tobin bronze, to show common rate of strain-hardening (from Figs. 3, 4 and 6).

with it the total stress. In this connection, note the difference in outlines of the "as recorded" curves in Figs. 4 and 6.

If these premises are correct, it should be possible, by using a common measurement for movement, to superimpose tensile and compressive *unit* stress curves, as in Fig. 5.

As suggested by the appearance of Fig. 3, samples of the same metal, which have undergone different amounts of cold-working, should have stress-strain curves the plastic portions of which should coincide along a common "rate of strain-hardening" curve. The points at which they join this curve would be more or less indicated by their initial yield points.

Accordingly, the outline of Curve 1 in Fig. 3 was transferred to Fig. 5 as the basic "rate of strain-hardening" curve for Tobin bronze (at room temperature). On this were plotted the corrected or unit

stress curves for the tensile and compression tests of both annealed and unannealed samples. In doing this, they had to be shifted to suitable starting positions, which necessitated a correction of all "per cent reduction" readings, increasing the steepness of the curves. The resultant grouping seems reasonably close.

Curves Plotted Several Times for Accurate Results

Inaccuracies of method may account for such discrepancy as did occur. Machine friction and play give inaccuracies in the recorded curves which, in turn, are rarely sharply drawn lines. Vital dimensions cannot always be obtained precisely. Curves must be replotted and relocated several times with slide rule calculations.

The tensile test Curves 2 and 4 were transferred

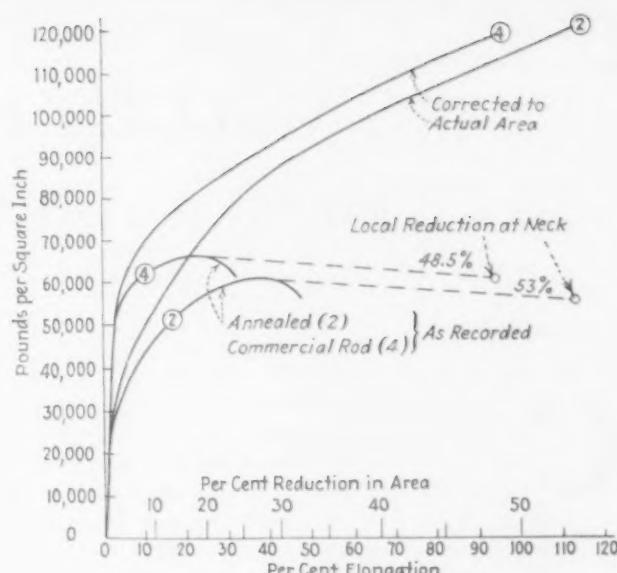


Fig. 6. Tensile tests of Tobin bronze as received and annealed, with relocation to unit stress and per cent change.

Table I.—Plastic Physical Properties of Tobin Bronze

Analysis (published): Copper, 61.2 per cent; Zinc, 37.3; Tin, 0.9; Lead, 0.4; Iron, 0.2

Physical Test	Annealed 1100 deg. F.	As Received 1/2 Hr.
(Ultimate) Reduction in area, per cent	53	48.5
(General) Elongation in 2 in., per cent	46	31
(Ultimate) Elongation (at neck), per cent	113	94
(Nominal) "Ultimate tensile," lb. per sq. in.	60,500	66,000
Actual ultimate tensile, lb. per sq. in.	120,000	118,000
(Nominal) Resistance to shearing, lb. per sq. in.	36,400	42,400
(Initial) Yield point:		
At approximate strain hardness of, per cent	10	20
Tensile test, lb. per sq. in.	25,000	52,000
Compression test, lb. per sq. in.	24,500	59,000 ^a
After 20 per cent reduction (= 25 per cent elongation):		
At approximate strain hardness of, per cent	28	36
Tensile test, lb. per sq. in.	71,000	83,000
Compression test, lb. per sq. in.	80,000 ^a	92,300 ^a

^a Higher than equivalent tensile yield points, on account of pyramiding effect in compressing low blanks.

The absolute strain hardness ratings are tentative.

The cold working for the second group of yield points was performed at about 70 deg. F.

from Fig. 6, using the unit stress (corrected) curves with a further correction due to the substitution of per cent reduction for per cent elongation (Fig. 7). The first part of these curves, up to the point where

general elongation ceased and necking began, was easily corrected. In this connection see Article 29 on relation between "Actual and Nominal Stress Intensity," in "Strength of Materials," by Arthur Morley; Longmans, Green & Co., 1928.

During the necking period, curve points might have been obtained by taking step-by-step readings of the load and the corresponding neck diameter. This portion of the curve was approximated, however. The final diameter at the neck and the final load locate the end of each curve.

(To be continued)

▲ ▲ ▲

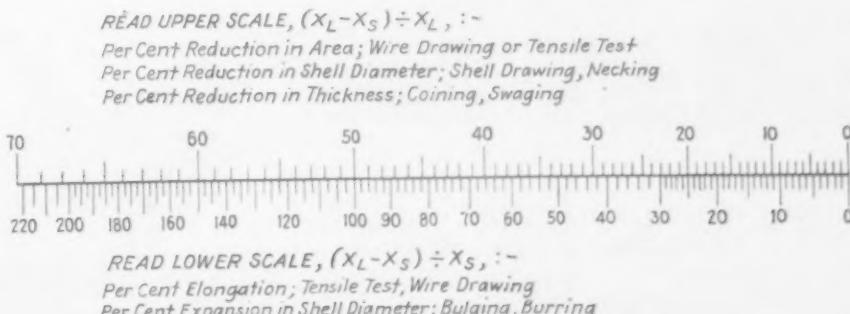
Research Service for Industry

RESEARCH work in the laboratories of the University of Michigan, in studying industrial problems, is brought out in considerable detail in a 40-page pamphlet, circular No. 5, issued by the university. It deals with a wide variety of subjects undergoing research in a number of the buildings at Ann Arbor, ranging all the way from metallurgy to ventilation in industrial buildings, from shrinkage in melting brass, to properties of metals at high temperatures, from the bearing power of soils to the nature and intensity of wind gusts.

Much of the equipment available for studying these and innumerable other problems is shown in the 31 illustrations, all taken from photographs.

FIG. 7. Scale for comparison of equivalent distortion effects.

▼ ▼ ▼



ARC WELDED HOUSE PROMISES NEW MARKET FOR STEEL

COMPLETION of a residence of arc welded steel frame construction, at a cost no greater than wood framing, opens up a new market for three millions of tons of steel each year. Such is the view of the Lincoln Electric Co., Cleveland, predicated on the experience in building a brick veneer dwelling in Cleveland's Shaker Heights district. The cost was 40c. a cu. ft., and the total difference in contract bids for steel or wood framing was \$24. This small difference was made possible, it is explained, by a special design for arc welded

construction by George Howard Burrows, Cleveland architect, eliminating shop fabrication.

Comparative bids received on steel and wood framing showed the following variations:

	Wood Construction	Steel Construction
Structural steel (erected)	\$ 180.00	\$ 881.50
Rough lumber	1,185.00	432.00
Carpenter labor	1,400.00	1,000.00
Plastering	800.00	615.00
Wiring	335.00	420.00
Masonry	2,820.00	3,395.50
	\$6,720.00	\$6,744.00



SILLS, studs and headers on the arc welded steel frame house. All steel erected without the aid of any tool but a welder.

DUE to steep pitch of roof, the third floor area is considerably reduced. To carry load from third floor joists to supporting framework required construction as shown in this photograph. (Below)

All other bids were identical for either type of construction.

Over 10 tons of steel were used in the construction, all of standard Carnegie shapes. Steel construction was inspected by Louis K. Whitcomb, structural engineer for the Carnegie Steel Co., and the welding was supervised by representatives of the Lincoln Electric Co., whose welding equipment and electrodes were used. Approximately 3 tons of steel were erected the first day. The arc welded steel frame is regarded as giving a strong, stiff structure that will not warp, shrink or sag.

With 250,000 residences under construction in a normal year and about half that number during slack times, consumption of 3,000,000 tons of steel is possible.

There are several unusual features in the construction. In the frame there are but two connections in which the weld is in shear, all other joints being direct bearing. Owing to the Norman-French architecture used, the framing is somewhat complicated, but the ease and facility of construction showed the practicability of steel in home construction.

The framework consists mostly of 3-in., 5.7-lb. I-beams, which served as sills, 3-in., 4.1-lb. channels, which served as studs, and 6-in., 12.5-lb. I-beams, which served as floor joists. The first floor sills were laid directly on the masonry. Across the sills

were placed the floor joists on 4-ft. centers. These floor joists were fused into the sills with small tack welds.

With the exception of the corner studs, which were 3-in., 5.7-lb. I-beams, the 3-in. channels were welded to the sills to support the second floor sills, 3-in., 4.1-lb. Carnegie I-beams. The load bearing partitions are of the same construction. Wherever extra stiffness was desired angles were welded between the studs and the sills.

The dwelling being of brick veneer construction only, an inside and outside skin of masonry is required. This is accomplished by the 4-in. exterior brick wall, which forms the outer shell of the building and 2-in. hollow tile, which forms the inner shell. Additional insulation is provided by the 3-in. dead air space between the brick and tile. The masonry is tied to the steel by means of clips which are welded to the stud flanges and hooked to the masonry.

The ceilings are of poured concrete, 2 in. thick and reinforced by steel pencil rods spanning 4-ft. distances between the floor joists. This concrete will serve as fire protection to the joists and offers a rough ceiling to which plaster can be applied. Ordinary 2 x 4-in. timbers set on edge across the floor joists form a framing to which the wood subfloor and finish floor are applied. This floor system allows wiring and piping in either direction without cutting the framework.

▲▲▲

Nitriding of Iron and Iron Alloys

THE effects of nitriding on the surface hardness and the structure of iron and its alloys with carbon, aluminum, chromium, molybdenum and vanadium have been reported by W. Eilander and O. Meyer in *Stahl und Eisen* (Jan. 29, 1931). Test pieces nitrided at fixed temperatures by streams of ammonia gas of constant velocity were tested for surface and depth hardness by means of a Rockwell and a Herbert pendulum apparatus on beveled sections, and the structural changes were observed by picric acid etching.

Tests on electrolytic iron at temperatures from 400 to 1100 deg. F. showed only two layers: a dark, granular outer layer, and a smaller, brightly etched inner layer adjoining the core in which separated nitride was distributed. Above 1100 deg. the eutectoid braunite was observed, but no other layers were seen. Nitrogen appeared to diffuse similarly to carbon. The nature of the chemical compounds involved and the effect of temperature indicate that the process involves shift of nitrogen atoms toward the less saturated groups of iron atoms rather than direct substitution of iron by nitrogen.

The presence of carbon retards the diffusion of nitrogen, partly because cementite reduces the effective cross-section of iron, and partly because of the dissolved carbon, making the nitriding of high-carbon steel and ordinary cast iron difficult.

Beyond a certain percentage of alloying element there was no improvement in surface hardness in alloys of iron with aluminum, chromium, vanadium or molybdenum. The greatest hardness in the iron-aluminum alloys was at 1 per cent Al. In general the most favorable compositions corresponded to those used in practice. The structures of the nitrided, highly-alloyed steels were quite different from those of iron and carbon steel. The nitrided iron-aluminum alloys exhibited a characteristic structure reminiscent of the rhythmical precipitation phenomena in colloidal systems.

The nitride hardening of iron alloys may be attributed to the precipitation of an insoluble nitride, such as AlN, in the iron ground mass, which causes hardening of the layers underlying the reaction edge, either by slip interference or by lattice distortion. The iron atoms act as carriers of nitrogen to the alloying element by intermittent formation and decomposition of unstable compounds.

Hardening of these alloys by nitriding is irreversible, and differs from the hardening of iron by carbon and from duralumin hardening in that, if softening and coagulation are induced by heating, the process cannot be reversed by subsequent heat treatment. The nitride which has separated does not redissolve in the iron ground mass.

STEEL PLATES CLAD WITH NICKEL FOR ACID RESISTANCE

SUCCESSFUL production of nickel-clad steel plates, primarily for use in the chemical industry, is opening a widening field of use, new in its commercial application, although a sheet of similar character was patented in Germany in 1893. Recently, in cooperation with the International Nickel Co., the Lukens Steel Co., Coatesville, Pa., rolled the first steel plates clad with nickel, which were used by the General American Tank Car Co. in fabricating a tank for transport of caustic soda.

These first plates were furnished in small size, but for the second tank car constructed with nickel-clad plates, full size tank material was rolled, 382 x 81 $\frac{1}{2}$ x 7/16 in. in the bottom shell, and 382 x 90 x 5 $\frac{1}{2}$ in. in the upper shell of the tank. Of flange quality steel, the plates are 5/16 in. thick, the coating of nickel contributing 10 per cent of the total thickness. Since production of the first nickel-clad tank steel, a new standard has been developed for particularly severe acid requirements, in which nickel provides 20 per cent of the total plate thickness.

Since construction of the first tank car of this material, the plates are being adopted for other container purposes; die vats, 7 ft. x 8 ft. x 30 in. deep, of 1/4-in. plates; batch mixers for cellulose products, requiring 35,000 lb. of plates in four units; six chem-

ical storage tanks, 30 ft. in diameter and 23 ft. in height, requiring 100,000 lb. of plates; and an evaporator for caustic soda, 9 ft. in height with an 8-ft. dome of 5 $\frac{1}{2}$ -in. plates, requiring a total of 15,000 lb.

At present pure nickel tubing is being used in connection with the nickel-clad tank installations, but the International Nickel Co. is experimenting with considerable success in the production of nickel-clad pipe, certain pieces having been lined with nickel, while others have been coated on the outside.

In a paper recently presented before the Institute of Metals division of Mining and Metallurgical Engineers, William G. Humpton of the Lukens Steel Co., F. P. Huston and Robert J. McKay, of the International Nickel Co., point out that a small tonnage of light-gage nickel-clad sheets has been imported into this country and used for such special articles as chocolate molds and plates for molding celluloid. Abroad the material has been used for cooking utensils, bullet-jackets and other articles.

Most Suitable in Heavy Tanks

The heavier product, the paper points out, is designed to fill the growing need for massive containers or other structures with special corrosion-resisting properties. These have been made in the past by lining or

covering shells fabricated of steel. By proper use of the nickel-clad plate, it is claimed that such structures can often be built more efficiently than by the older methods. The heavy weights involved make the use of solid alloy plates uneconomical, and pressure requirements, as well as inconvenience of working, make lining or covering an unsatisfactory procedure.

Working properties of nickel and steel, as used in heavy plate, are well suited to the production of the plates. Proper rolling temperatures of the two metals are not far apart, and heating and rolling atmospheres can be made to be satisfactory for both. The physical properties at rolling temperatures are close enough to produce uniform sheets without special precautions. Coefficients of expansion also agree sufficiently not to be an obstacle. The only point requiring special attention is the bonding or welding of the metals. The fact that nickel and steel are mutually soluble in all proportions facilitates this and insures a good weld if intimate and forcible contact is secured.

"In production of nickel-clad plate," says the paper, "relatively thick sections of steel and nickel are placed in intimate contact, heated to a high temperature, and rolled to the finished plate. The bonding of the two metals rests upon the tendency of nickel to alloy with steel at high temperatures



THE second tank car constructed of nickel-clad flange quality steel was fabricated of full-sized tank plates in both the bottom and upper shell, with nickel representing 10 per cent of the thickness of the plates.

TANK plates of flange quality steel with a nickel coating contributing 10 and 20 per cent of the total thickness have been developed by the International Nickel Co. and the Lukens Steel Co. as material for heavy containers in which corrosion resistance is a factor.

The first plates rolled with nickel-clad surface were used by the General American Tank Car Co. in tank cars for transporting caustic soda, but the product is finding other uses, for example, for chemical storage tanks, mixers for cellulose products and evaporators for caustic soda.



Interior of the first nickel-clad steel tank constructed in the shops of the General American Tank Car Co. It is completely surfaced on the interior with nickel. The tubes for heating the contents are of solid nickel, but, as a result of recent experiments, may eventually be replaced with nickel-clad tubing.

to form solid solutions at the plane of contact."

When the first plates were rolled with 10 per cent of the total thickness of 5/16 in. contributed by the nickel, test pieces showed the following increase in strength gained from the addition of the nickel coating:

Gage	Yield Point, Lb. per Sq. In.	Ultimate Ten- sile Strength, Lb. per Sq. In.	Elongation, Per Cent in 8 in.	Reduction in Area, Per Cent
Test along edge in com- mon steel....	0.320	42,200	51,200	41.75
Test taken about 6 in. in from rolled edge, includ- ing nickel- clad surface	0.323	45,600	57,500	29.0

Tests under working conditions have demonstrated that addition of the nickel in the form of a relatively thin sheet, bonded firmly to one side of the steel, does not alter to a noticeable degree the behavior of the plate when subjected to the usual fabricating operations, such as bending, pressing, riveting and welding. The average plate shop can be expected to have facilities adequate for the working of nickel-clad plate.

In fabricating nickel-clad plates, cold operations, such as bending, flanging, forming, shearing, preparation of rivet holes and the like, are done as with common steel, without the necessity of providing special tools and equipment, or changing the manner of performing the work. In hot

operations the essential difference from steel in working the duplex plate is the necessity of providing a means of heating to prevent possible injury to the nickel.

Nickel and Steel Completely Bonded

"The efficiency of the bond, in its ability to follow closely every change in deformation of the plate, has been demonstrated," says the paper, "in the forming of standard and dished boiler heads. Probably the most severe test imposed on the bond is in hot-pressing tank car heads. These heads are pressed, in a hydraulic press, in a simple die, consisting of a ring and plug without a holddown pad. The flat circle is pressed, nickel inside, to a finished head 78 in. in diameter and $\frac{1}{2}$ in. thick, with a straight flange about 6 in. deep.

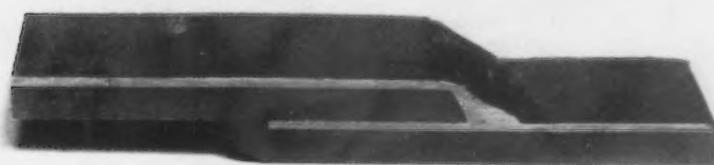
"Due to the fact that no pressure pad is used, the wrinkling is excessive at the edge of the circle as the metal flows into the die, and the bond is subjected to severe shear. The bond is found to be amply strong to withstand this operation without a sign of loosening. Flanged and dished heads have been produced by cold-pressing both with the nickel on the convex side and on the concave side. Standard die equipment as ordinarily used for steel was employed.

"Hot spinning is a severe operation and several heads 60 in. in outside diameter of $\frac{1}{4}$ -in. plates have been flanged by this process without indication of rupturing the bond or injuring the metal.

"When flanging the duplex plate, where the nickel coating is on the out-



A lap-welded joint (above) with 10 per cent nickel-clad steel plates. (Below) A butt-welded joint, demonstrating the facility with which these plates may be welded.



side of the bend, the elongation of the outside fibers results in reducing the thickness of the nickel over the length of the arc.

May Be Easily Welded

"Welded joints are made in the various types common to steel plate construction; namely, butt, lap and fillet. In butt welding, probably the best practice is to lay the major mass of weld metal in the V made by beveling from the steel side almost completely through the plate. Thus the greater part of the strength of the weld will lie in a steel weld as made by regulation steel methods. A trough of reasonable dimensions, say 1/16 x 1/16 in. for 1/2-in. plate, is thus left on the nickel side. This trough is filled, using nickel welding rod."

The nickel-clad steel plate is reported slightly lower in cost for heavy work than other rust and acid-resistant metals and alloys of steel. At about 22c. a lb., the nickel-clad plate is suggested as suitable for certain purposes where lower cost than is possible with either pure nickel or chrome-nickel alloy steel is essential.

▲▲▲

Resistance Welding Gaining in Europe

According to the Federal Machine & Welder Co., Warren, Ohio, the application of electrical resistance welding is gaining very rapidly in manufacturing processes in European countries. That company has recently sold what is said to be the largest automobile rear axle housing welder ever installed in Italy. The company has also shipped a good many welders to England, France and Germany. M. L. Eckman, engineer with the Federal company, sailed for Europe on July 18 to superintend the installation of welding machinery in various European shops and will also assist in training the welding personnel of such companies as Renault and Citroen in France, Fiat in Italy and Fried-Krupp in Germany. He also intends to spend some time in the lecture field in discussing welding procedure.

▲▲▲

Northern Engineering Works, cranes and hoists, Detroit, has appointed R. E. Condit its representative in the Dayton, Cincinnati and Columbus districts, with offices at 901 East Third Street, Dayton, and 705 Gwynne Building, Cincinnati. Hill Equipment Engineering Co., 4620 Delmar Boulevard, St. Louis, has been designated to represent the company in the St. Louis territory.

▲▲▲

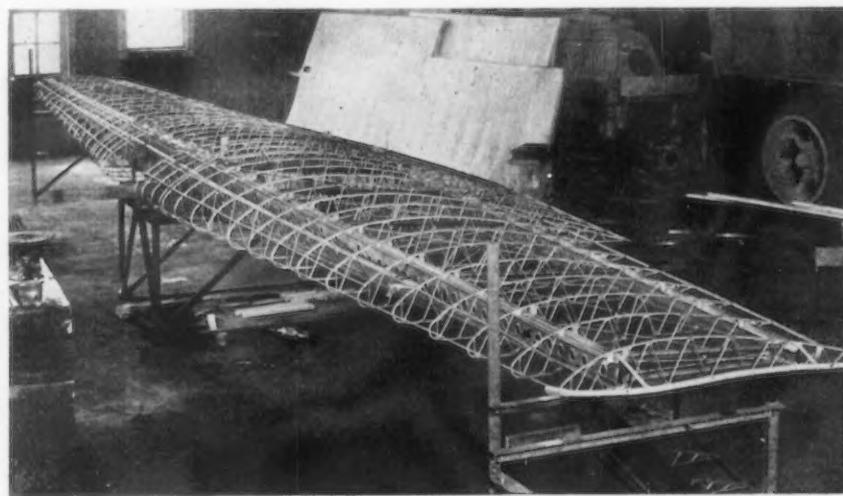
Davies & Thomas Co., founder and machinist, Catasauqua, Pa., has removed its New York offices to the Empire Building, 71 Broadway.

Rustless Steel Wing Has High Tensile Strength

A MONOPLANE with wings entirely of Allegheny metal has been built by Fleetwings, Inc., New York, and is being tested at Roosevelt Field, Long Island. The wing is of full cantilever type, tapered in both plane and section, has a spread of 41 ft. and a chord from front to back of 105 in. at the root and 52½ in. at the tip. The weight is 2.14 lb. per sq. ft. including ailerons, gear and fabric covering.

The chief advantage claimed for the chrome-nickel alloy steel is resistance

sheets 0.015 to 0.025 in. thick, perforated for greater lightness and with all perforations flanged. The cap section of the spar is of cold-rolled strip steel. The ribs are also of cold-rolled strip from 0.008 to 0.12 in. thick, with tensile strength of about 190,000 lb. per sq. in. The strip steel is drawn into a modified U-shape and the various members of the wing are spot-welded. The trailing edges, ailerons and elevator also are of cold-rolled strip, with a thickness of 0.012 in. The entire assembly is spot welded



Tests of this rustless steel aircraft wing, fabricated by Fleetwings, Inc., Roosevelt Field, Long Island, indicate 25 per cent greater strength in addition to corrosion resistance and elimination of heat-treatment by the manufacturer.

to atmospheric corrosion, but it is also suggested that while its specific gravity is comparable to ordinary steel, its tensile strength, in this wing, is about 190,000 lb. per sq. in., compared with 55,000 lb. per sq. in. for aluminum alloys hitherto used for the purpose. It is further claimed that the yield point is close to the tensile strength and that, as the chrome-nickel alloy attains its high tensile strength from cold working, additional heat treatment is unnecessary. Being corrosion resistant, the alloy requires no protective coating preceded by sand blasting. This eliminates two operations estimated to provide a sufficient saving to offset the higher initial cost of the material.

The new airplane, the first complete aircraft built by Fleetwings, Inc., has spars, ribs, tail surfaces, trailing edges, control columns and gasoline tank support braces of Allegheny metal. In the ribs it varies from 0.008 to 0.012 in. in thickness, and in the spars is tapered from 0.050 in. at the center of the wing to 0.015 in. at the tips. The trailing edges, ailerons and elevator are mostly of metal 0.012 in. thick.

The webs of the spars are from

throughout with special spotwelding equipment specially developed to meet the requirements. Fittings are formed of separate pieces of the alloy, ranging up to 1/8 in. thick welded together.

The ribs have passed a severe test, a rib having been loaded to half its designed capacity, and the spar points vibrated at 1150 vibrations per min. at 1/32 in. amplitude for 50 hr., after which the rib was subjected to a static load test with the full design load. The Department of Commerce requirement calls for only 10 hr. of vibration.

▲▲▲

Youngstown Sheet & Tube Co. has placed an order with H. A. Brassert & Co., Chicago, for a 40,000 c.f.m. disintegrator and a zoned high-efficiency hot blast stove constructed of octagonal tile with graduated inserts for its Campbell works.

▲▲▲

Chamber of Commerce of the United States will hold its twentieth annual meeting May 18, 19 and 20, 1932, in San Francisco.

Strength and Light Weight in Welded Steel Pole

ADAPTATION of a special alloy steel to an unusual welded structure has enabled the Pittsburgh Crucible Steel Co., Pittsburgh, subsidiary of the Crucible Steel Co. of America, to develop a steel pole for transmission towers, street lighting and other purposes which combines unusual strength with a comparatively light structure. An invention of V. F. Hammel, by whose name it is designated to the trade, the design embodies the principle of the cubic structure developing maximum strength with minimum weight.

It is essentially a one-piece cylindrical unit, free from rivets, bolts, joints, splices and other features which might make for weakness in a built-up structure. The pole is made mechanically and the spiral rods are wrapped clockwise and anti-clockwise at the same time, under compression, on a solid mandrel. The vertical members are then inserted in position and

pressed on to the wrapping rods through resistance-contact welding. In this way the rods and the vertical members become an integral part of the whole, developing extraordinary properties.

Some idea of the strength may be gleaned by comparisons with the standard tubular pole made of ordinary structural steel, which will develop $2\frac{1}{2}$ lb. of strength for each pound weight of pole. A Hammel pole of the same weight and dimensions, when made of common structural steel, is said to develop from 5 to 6 lb. of strength for each pound weight of pole.

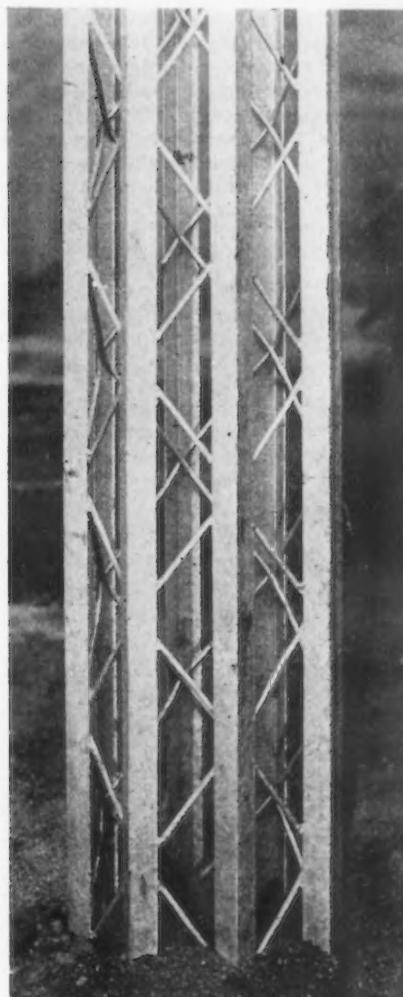
Special Alloy Steel Used

In the construction of the pole a special steel is used developing an elastic limit of 54,000 lb. per sq. in., an ultimate stress of 88,000 lb. per sq. in., elongation of 26 per cent in 2 in. and a reduction area percentage of 52. The steel is made by a slow refining process, assuring a solid, homogeneous metal, free from slag and other inclusions commonly responsible for rapid corrosion. Certain alloys that improve the corrosion-resisting properties, including small quantities of copper, nickel and molybdenum, are introduced.

Three standard forms are made: four-angle, six-angle and eight-angle. The four-angle pole weighs from 6 to 30 lb. to the foot of length, and develops from 5 to 6 lb. of strength per pound weight of pole. The six-angle pole weighs from 8 to 35 lb. to the foot length, and develops from 6 to 7 lb. of strength per pound weight of pole. The eight-angle pole weighs from 10 to 40 lb. to the foot length, and develops from 7 to 10 lb. of strength per pound weight of pole.

Developed to meet conditions of high strength, combining rigidity, lightness and low price, the four-angle pole under average conditions is competitive with wood. The six-angle pole is essentially a circular structure and, while embodying the characteristics of the four-angle pole, is more ornate in appearance. The eight-angle pole is an extraordinarily strong structure, as well as ornamental. The poles are made to seven standard specifications, covering the various requirements of the utilities and railroads in the way of strength, torsion and other specifications.

Made in various lengths, the poles by various methods of assembly form the basis of combinations for special structures, such as Tall poles, "A" frames, "H" frames and towers. The design and adaptation are so diversified that only calculation of the loads



Close-up of base of pole showing construction details.



Several types of the welded skeleton pole are shown, one carrying a wooden upper section.

which are to be placed on the structure, necessary clearances and factors of safety must be determined. From these the structure itself can be built from the standard types of design.

The Hammel pole also lends itself to combinations with wood, giving a composite structure which combines the elements of maximum strength in bending, torsion and columnar action. Where stump wood or other suitable forms are available these may be simply and effectively secured to a Hammel base. Local slender timber where available may be used for attaching to the top of the structure. This is a consideration where the poles are to be exported, the light weight rendering transportation easy to wild, mountainous and otherwise inaccessible regions. Where it is necessary to change a line to another location this pole's portability and light weight permits it to be readily removed and replaced at minimum cost.



Sales of mechanical stokers in May totaled 80 units, of 23,646 hp., compared with 65 of 18,723 hp. in April, according to reports received by the Bureau of the Census.

Electric Coils Impregnated and Parts Enameled by Centrifugal Machines

NEW applications of centrifugals, heretofore used principally for washing, drying and extracting, include enameling, japanning and coating, and the impregnating under hydrostatic pressure of electric coils, wood, fabric and other materials.

As built by the Leon J. Barrett Co., Worcester, the machines for all these applications are alike in general design and appearance, although the bowl or container for the parts to be processed varies according to the application. The action of the machines depends upon a reasonable balance, because the container with its contents must revolve at high speed on a spindle yielding but slightly from the vertical, the method of sustaining in the vertical position being partly gyroscopic and partly mechanical. A load will assume a running balance at the center of gyration and run fairly smoothly even when the spindle wobbles around the perpendicular, a condition occasioned by as much as 20 lb. or more out of balance. The heavy-duty models are capable of handling heavy parts provided that they can be whirled in fair balance. The speed is according to requirements and is permanently maintained through the constant speed of a built-in motor.

For Enameling, Japanning, Painting and Coating

For coating parts made of wood, fiber or metal, weighing from a fraction of an ounce to several pounds, the company has developed the centrifugal Filwhirl Enameler. In these operations saving in time, evenness of coating and freedom from drip and thick spots, together with bulk handling, are advantages claimed.

The parts to be processed are placed in the container and coating materials, either hot or cold, enter the machine through a valve. The parts become coated immediately and completely. Excess material is thrown off and returned to the supply tank, thus eliminating all waste of material. Every corner and crevice becomes coated uniformly; threads in tapped holes do not clog. Because of the cleanliness, as well as in overcoming the difficulty of covering inside, hidden areas, the centrifugal process has become popular in several industries. With care excellent quality of work can be done, although the Barrett company makes claim only for rapid bulk handling. The machine has a large hourly capacity and requires a minimum of floor space.

For impregnating electric coils, wood fabric and other materials, the parts are submerged in the impregnating fluid within the closed bowl of the machine. The bowl is then rotated at a predetermined speed. Centrifugal

force presses the liquid against the wall of the bowl, thus building up and maintaining a maximum hydrostatic pressure at the largest diameter, or at the solid rim, the pressure decreasing inwardly with reduction of diameter of the whirling mass toward the center. For example, a bowl running at 1200 r.p.m., fluid tight except for a 4-in. hole at the upper axis, containing liquid the specific gravity of which would develop and maintain 90-lb. hydrostatic pressure at the bowl rim would gradually reduce to 34 lb. on a 14-in. diameter and to zero at a 4-in. diameter, or at the inner surface of the liquid wall. Thus there is an area or wall of fluid in which submerged articles would be subjected to a pressure that may be easily calculated for any diameter.

As rotation continues the liquid would be forced completely through the article toward the center at a rate depending upon the speed of rotation, the radius of the basket, the density of the liquid and the permeability of the parts being processed. As impregnation progresses any air will be literally squeezed out toward the low pressure center opening. By operating a valve the impregnating material is drained from the revolving bowl and caused to traverse the coils in the reverse direction. Thus, the coils are thoroughly permeated and excess material drained and returned to tank.



The entire rotating unit, positioned on a ball and socket universal in the base of the machine, is designed to sway under complete control about the vertical axis. This design confines the pulsations to the container. It has been found that the amplitude of the oscillating movement, which because of unequally distributed loads is always in evidence, will cause the articles in the bowl to be subjected to a pulsating pressure, due to variance of hydrostatic pressure on the different diameters. Such pulsations are said to give decided impetus to the penetrating effect of the liquid on the parts being processed. Obstinate coils are said to be completely impregnated in 3 min. Ordinarily the same coils would require processing for 6 hr.

Safety Carrier for Gas Cylinders

TO facilitate the transporting of cylinders of oxygen, acetylene and other gases for short distances by hand, the Carbo-Oxygen Co., Benedum-Trees Building, Pittsburgh, has brought out the safety carrier shown in the accompanying illustration.

The device consists of a length of standard steel pipe near one end of which is attached a loop of flat steel

to hold the capped valve-end of cylinders of the oxygen or hydrogen type. At the other end is a forked hook to support the bottom of the cylinder. This hook is automatically brought into position by an upward lift of the hinged end of the supporting bar. It is released from the base of the cylinder by the reverse action.

Acetylene and other short tanks may be carried by two swinging hooks. The lower hook is arranged to slide along the main bar where it may be locked in position.



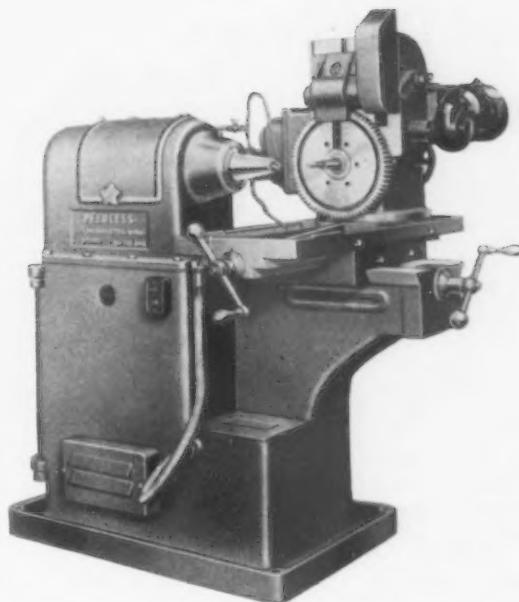
Universal Gear Chamferer for Small-Lot Work

FOR small lots of gears of various sizes the City Machine & Tool Works, Dayton, Ohio, has brought out a universal type of its model 3 Peerless chamfering machine. It is not necessary to install a different cam with each change in the pitch of gear, four or five cams of different pitch being carried on a sliding shaft in the machine; the proper cam is shifted to the operating position by moving a convenient lever.

The worm gear and idler are independent of the pitch of the work. Use of both a single and double-thread quick-change worm enables the work to be driven by a gear having either the same or double the number of teeth as the gear being chamfered. This requires approximately half the number of drive gears for the same range of work as other models. For

small lots, it is often possible to use one of the gears to be chamfered on the driving shaft, thus avoiding the expense of a special driving gear.

It is pointed out that the universal



ADJUSTMENT for several gear pitches is made merely by moving a shift lever.

Automatic Controller for Process Cycles

FOR the automatic control of process cycles as in the operation of presses and molds for the manufacture of articles from rubber and plastics, or in textile, paper or other mill practice, the Bristol Co., Waterbury, Conn., has brought out a pneumatic cycle controller, cam-actuated and capable of application whenever valves, or mechanisms that can be made subject to the control of valves, are to be operated in a more or less definite sequence.

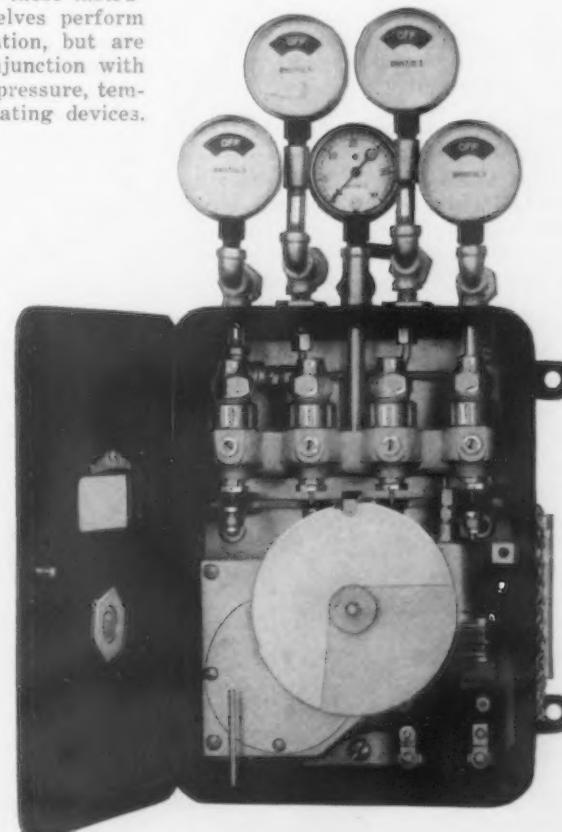
There are many controlled processes in which the sequence of the several events that terminate the cycle is the reverse of their order at the beginning of the cycle. Such process cycles may be controlled by the single-cam apparatus illustrated in which a number of pilot valves are actuated in turn by a motor-driven cam. Adjustment within certain limits is possible and speeds are determined by change-gearing between the synchronous motor and the camshaft. The starting and stopping of the motor are usually governed by a pressure-operated switch within the case of the instrument.

When more flexibility is required, however, and the events in the cycle overlap by varying degrees, another model of the controller is obtainable in which several individual cams are mounted on a common shaft. Each cam is adjustable both in respect to the duration of its active part in the

cycle and its position in the sequence of events.

It is pointed out that these instruments do not in themselves perform the functions of regulation, but are designed for use in conjunction with pneumatic or electrical pressure, temperature or other regulating devices.

A SINGLE cam operates control valves in proper sequence; timing adjustments are provided by change gearing. A multiple-cam controller is also obtainable.



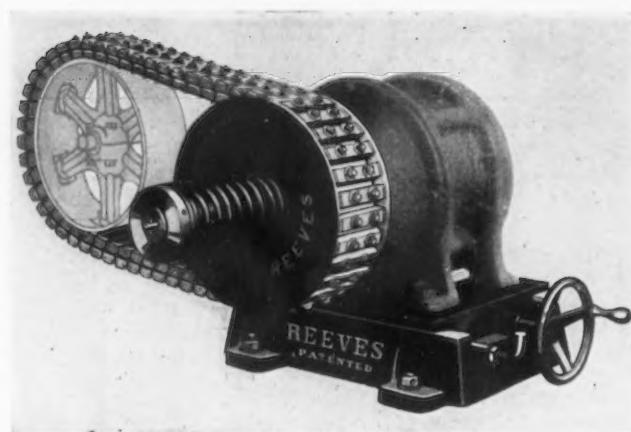
Variable-Speed Transmission Has Simple V-Belt Drive

FOR driving small machine tools, wrapping machines and other light machinery, a variable-speed belt transmission has been placed on the market by the Reeves Pulley Co., Columbus, Ind. Designated as the "Vari-Speed" motor pulley, the unit provides for an infinite variation of speed up to a ratio of 3:1. Six sizes are made for capacities ranging from $\frac{1}{8}$ to $7\frac{1}{2}$ hp.

The unit consists of an assembly of two opposing cone-faced disks, one stationary and one sliding, and an adjustable power compression spring, all of which is self contained and mounted on the motor shaft; a special motor base with adjusting handwheel, by which the motor may be moved forward or backward; and a special type of V-belt which contacts on its sides with the cone-faced disks and on its flat surface with the flat-faced driven pulley.

By moving the motor toward the driven wheel, the cone-faced disks assume a larger effective diameter, thus

BY moving the motor along the rails of the special base, the effective diameter of the driving pulley is altered automatically.



increasing the speed of the driven machine. Moving the motor away from the machine, by turning the handwheel in the opposite direction, causes the disks to separate thus decreasing the effective diameter of the driving wheel. This movement of the motor on the base varies from 2 in. on the smallest sized unit to 6 in. on the largest size.

An adjusting nut on the standard motor-shaft extension permits regulation of the spring tension. The sliding disk is mounted by means of double keys on the hub of the stationary disk; the latter is keyed, or

anchored by means of a set screw, to the shaft extension.

Two types of V-belts are used. On the three smaller sizes a rubber belt of special construction is employed. The larger units, one of which is shown in the accompanying illustration, are furnished with a double-block type of V-belt, the edges and bottom surfaces of the blocks being leather covered to contact with the throat of the disks and the flat face of the driven pulley respectively. High efficiency is claimed for the transmission because of the automatic tension of the compression spring.

Reversible Forming Machine Minimizes Flats at Ends

AN open-end forming machine that will bend angles, tees, leg in or leg out, and flats, on flat or on edge, into circles of different diameters, depending on the size and shape of the section or the diameter of the circle to be produced, has been placed on the market by the Hendley & Whittemore Co., Beloit, Wis. The pinch-type design

affords positive feed of the material through the rolls regardless of the size, shape, or thickness of the section or the diameter of the circle to be produced. It also makes possible, by reversing the work between passes, to reduce greatly the amount of flat and distortion at the ends of the material.

On each of the three roll arbors

there are two hardened tool-steel rollheads separated by a hardened collar of suitable thickness and diameter for the work to be done. The machine is regularly equipped with six roll heads, two for each arbor, and one separating collar for each arbor. The roll heads are 7 in. outside diameter, 2-in. face, bored $2\frac{1}{2}$ in. and keyseated $\frac{1}{2}$ in. for the arbor. With this equipment it is possible to bend $2 \times 2 \times \frac{1}{4}$ -in. angles or tees. Special roll heads are necessary for other work such as bending pipe, channels, tubing, I-beams and other shapes, also for coiling, flanging, belling, and beading.

The top roll arbor is carried in a heavy swinging housing that has a vertical adjustment of 3 in. This permits the completed circle made from $2 \times 2 \times \frac{1}{4}$ -in. and smaller angle iron to be taken from the machine without the removal of any roll heads and without changing the adjustment of the third or forming roll. This forming roll is adjusted by means of a conveniently located handwheel. The roll pinions are heavy semi-steel castings molded from machine-cut metal patterns. They are firmly keyed to the roll arbors and remain in mesh.

The machine is provided with two steel-faced adjustable shoes to guide the stock as it enters and leaves the rolls. The main housings and gearing are semi-steel castings of extra heavy construction. A 5-hp. variable speed slip ring motor of reversing type is recommended.



THE three angle-rolls run at 12 r.p.m., providing an operating speed of 22 ft. per min. The machine is 34 in. wide and 47 in. high.

WEEK'S EVENTS AND COMMENTS IN BRIEF



FARM AND FACTORY

ACCORDING to the Department of Commerce, the manufacturing industries of the United States, in 1929, produced products valued at close to 75 per cent of the total annual volume of business of 93 billion dollars. Farm products represented, in value, less than one-fourth of that of manufactured products. Putting together all of the activities outside of manufacturing, such as farming, mining, forestry, fishing and hunting, etc., their total volume, in dollars is one-third that of manufacturing.

This certainly proves that we are a manufacturing nation, by a substantial margin. Inasmuch as exports were substantially offset by imports, it would also seem to indicate that income arising from factory operations provided the lion's share of our total purchasing power. The farm contributed approximately 16 billions of buying power against industry's 70 billion.

Food requirements at best keep pace with population growth. But the desire to own manufactured products knows no such limit. As a nation progresses in wealth, its factories grow faster than its farms.

♦ ♦ ♦

CONSTRUCTION

A REPORT from the public works section of the President's Emergency Committee for Employment discloses that the total of awards for public and semi-public works contracts since Dec. 1, 1930, has passed the two billion dollar mark. Roughly, this means a year's work for approximately a million and a half workers, or better put as a million and a half work-years. We need an added potential of about six million work-years more to make things comfortable. But we cannot expect the construction industry to provide it.

SAFEGUARD PROFITS

"CAPITAL invested in industrial enterprises has a right to expect profitable returns.

"Where profits are lacking capital will run away very fast.

"Efficient management, research to develop new uses and new markets, reduction in costs, aggressive salesmanship and advertising, and active participation in trade associations are the means of safeguarding profits under present-day conditions.

"We must organize to meet the competition between industries and the commercial competition between nations.

"Bankers are frowning upon the price cutting wars and destructive practices that are eliminating these profits.

"It is the ignorant man in business or the poorly equipped concern that starts out to get business by any means that upsets a stable condition. He forces, by his own stupidity, a demoralized price structure that the more intelligent are compelled to meet.

"The time has arrived when the premium should be removed from incompetence and placed where it belongs—with intelligence as reflected by right methods."

This sound and timely advice, addressed to the structural steel industry by the American Institute of Steel Construction, can well be taken to heart by industry at large.

PRICES

JUNE, according to the United States Bureau of Labor Statistics, witnessed a continuation in the drop of wholesale prices. The composite index number at the end of June was 70 as compared with 71.3 at the close of the preceding month. By this time, industry and business should have learned the futility of price cutting *per se* as a means of stimulating sales. No one wants to climb aboard an airplane during a tailspin.

♦ ♦ ♦

ENCOURAGING

AMONG the encouraging signs of progress toward recovery is the report that Truscon Steel Co. has shown successive monthly increases in schedules, reaching 65 per cent this last week. Youngstown Pressed Steel Co., at Warren, Ohio, now has a larger force in its machine shop department than at any time in several years past, working on firm orders. J. T. Dillon, president of Struthers Wells - Titusville Corp., reports an increase in both inquiries and orders for commercial heating and power boilers. Bausch & Lomb Optical Co. looks for a much more favorable last half year than the first six months of 1931.

♦ ♦ ♦

RATE HEARING

AS is to be expected, the railroads are not encountering altogether smooth sailing in endeavoring to reach their objective of 15 per cent higher rates. Interstate Commerce Commission is hearing both sides of the story, and the opposition has been permitted to introduce some of its evidence. Adjournment will be had until Aug. 31, to permit shippers and others to prepare and present their protests. A decision, therefore, can hardly be expected before the middle of September, if as soon.

Also in This Issue

- Dullness Continues in Machine Tool Trade
- Automobile Builders Cutting Summer Output
- Sheet Sales Gain; Output Falls
- British and the Continent Await Debt Conference Result

Large Continuous Plate Mill Completed

United Engineering & Foundry Co. has completed construction of the largest continuous plate mill in the world. It was completed within a period of one year, probably a record time for building such a massive piece of machinery. It is claimed to be the largest mill installation ever made in the world for rolling any steel product. The mill contains the largest number of huge pieces of equipment in any existing plant.

Motors aggregating approximately 30,000 hp. are required to operate the mill. It is possible to roll plates continuously up to 92 in. in width, and a finished ribbon of steel is possible up to 140 ft. long. The delivery speed of the plate mill varies from about 350 to 700 ft. a min.

Total length of mill from soaking pits to finishing end is 2100 ft., or about two-fifths of a mile. Some of the outstanding characteristics of the installation are as follows:

It is the heaviest plate mill in the world.

The vertical edging mill, a component part, is the largest ever built.

The gear drive for the roughing stand probably is the largest ever attempted. There are two gears 21 ft. 8 in. in diameter, with teeth 6 ft. in length across the face.

Continuous operation is carried out in this mill to the greatest degree. Starting with an ingot, the steel passes through a universal slabbing mill. The mill is so arranged that the finished plate can be rolled in one heat from the ingot, or by slabs being reheated in continuous slabbing furnaces.

After leaving the slabbing mill, the steel goes through one stand of scale-breaking rolls, three stands of two-high roughing rolls, two vertical edging roll stands and then six stands of four-high finishing rolls. The four-high mills are all of the roller-bear-

ing type, containing roller bearings of tremendous size.

After passing through the continuous plate mill, the plate goes through plate leveling machines, is carried over spool-type cooling conveyors; goes to the plate turnover for inspection and finally passes through various types of shears, one type of which is considered remarkable for accuracy and method of handling. The finishing provides for production of various types of plates.

The entire mill is under electric control, for controlling both the thickness of the plate and the operation of the side guides and looping apparatus. The driving motors are of adjustable speed.

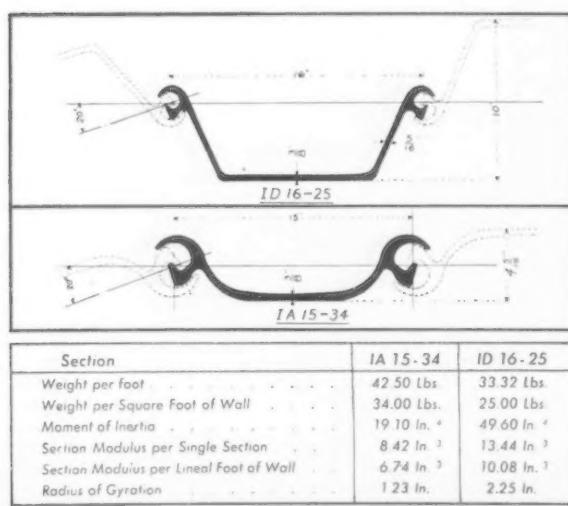
Sheet Sales Gained But Output Fell in June

Sales of steel sheets by independent mills gained 15,000 tons in June over May, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers. Sales last month were 163,599 tons, compared with 148,618 tons in May. The increase evidently was due to the tonnage brought out last month by the price advance effective July 1. This resulted also in a slight increase in unfilled orders on July 1.

However, production and shipments declined rather sharply. Production, amounting to 147,843 tons, was almost down to the last December level of 145,125 tons. Shipments were 156,161 tons, compared with 191,942 tons in May. The June report and comparisons, in net tons, follow:

	June	May	April
Sales	163,599	148,612	191,987
Production	147,843	201,846	213,608
Shipments	156,160	191,942	211,118
Unfilled orders	304,107	296,731	325,169
Unshipped orders	92,395	86,912	91,431
Unsold stocks	75,618	82,532	85,415
Capacity per month	543,400	527,900	543,400
Percentage reporting	67.6	67.6	67.6

	Percentages, Based on Capacity		
Sales	44.5	41.7	52.3
Production	40.3	56.6	58.2
Shipments	42.5	53.8	57.5
Unfilled orders	82.8	83.2	88.5
Unshipped orders	25.2	24.4	24.9
Unsold stocks	20.6	23.1	23.2



Inland Makes Sheet Piling

INLAND STEEL CO., Chicago, is now producing steel sheet piling in two sections weighing 42.50 lb. and 33.32 lb. a foot. Other sections will follow so that, in the near future, the line will be complete.

Showing of New Millers Attracts 900 Visitors

The demonstration of milling machines of new design, conducted July 15 to 17 by the Kearney & Trecker Corp., Milwaukee, was attended by 900 visitors. The demonstrations included both knee-and-column and production-type machines.

The exhibits were grouped at seven stations, lettered A to F inclusive. At station A a miller of "the gay 90's" was contrasted with one of the latest type. At station B the cutting of cast iron, S.A.E. 1020 steel and cast aluminum were shown; a loud speaker system was very effective here as each demonstration was discussed in detail.

The apprentice training school had an exhibit and various types of welded fixtures were shown. At station F various parts and unit assemblies for the New Milwaukee "Simplex" and "Duplex" production-type milling machines were exhibited.

The sound-proof test room housed a complete educational exhibit of the new knee-type milling machines and various unit assemblies. Tiered seats had been arranged and visitors, made comfortable by the installation of a special cooling system, were given details of the new machines.

Wholesale Commodity Prices Still Sinking

Index numbers of wholesale prices are reported by the United States Bureau of Labor Statistics for June as 70, compared with 71.3 in May, with 86.8 a year ago and with a recent high of 98 in July, 1929. The decline since that high has been almost continuous, a brief interruption last summer having been fractional.

Metals and metal products, one of the 10 major groups into which the 550 commodities are sub-divided, show a fractional decline to 87.4 from 87.8 in May. This is accounted for by drops from 87.2 to 86.9 in iron and steel, from 60.6 to 58.9 in non-ferrous metals, and from 94.7 to 94.6 in agricultural implements. The other two main components, automobiles and other metal products, remain stationary at 98.6 and 94.4 respectively. The structural steel element in the building materials group remained at 84.3, as in May.

Raw materials, semi-manufactured articles and finished products all declined, the first named from 66.5 to 64.7, the second from 68.9 to 68.5 and the finished goods from 75.1 to 74. With only one exception, all of the sub-groups are lower than they were a year ago. Anthracite coal alone shows an increase not only from June, 1930, but also from May, 1931. Agricultural implements are down only 0.4 point from last year, being now 94.6 against 95.



.....OFF THE ASSEMBLY LINE.....

Automobile Builders, Cutting Output, Center Attention on Sales

DETROIT, July 20.

ENTERING the final 10 days of July, the automobile industry is curtailing its activities still further, and there seems little likelihood that production this month will be higher than 200,000 cars. Moreover, there is evidence that the lowest point for the summer period will not be reached until August, when total output may not get much above 175,000 cars. Plymouth is the sole exception to the downward trend. Its assemblies this month have been increased twice and now are reported to stand at 21,000 units, with a strong possibility that August will not bring a recession from this highest peak in Plymouth's history.

It is said that Chrysler, Dodge and DeSoto dealers, through whom the Plymouth is marketed, have never been aroused to great enthusiasm over this low-priced car in the Chrysler line until the present new model was revealed.

With about 66,000 cars planned for July, Chevrolet is expected to show a seasonal recession to 50,000 in August. It is virtually certain that Chevrolet will be one of the few companies which will not suspend manufacture some time during the summer. Cadillac is going down this week for 15 days and Oakland-Pontiac is said to have a shutdown set for the two weeks beginning July 25. Others will follow at the end of the month or early in August. Aside from Plymouth, the Chrysler companies, especially Dodge, have drawn in their activities as retail demand declined. Hudson-Essex is suffering severely from the summer inertia coupled with the reduced buying power of the public and is operating only one day a week. Reo is doing well with its light-duty truck, the sales of which are offsetting to a considerable extent the dullness in passenger cars. Auburn's schedule this month calls for fewer units than in June, likewise Buick's and Oldsmobile's. Nash and

Automobile industry will reach its lowest level in August, when total output probably will not be over 175,000 cars.

* * *

Plymouth has twice revised production schedules upward, and July assemblies are now set at 21,000 cars. The same rate probably will be maintained during August.

* * *

Chevrolet is expected to make 66,000 cars this month and 50,000 cars in August.

* * *

Many plants are turning their attention to preparations for 1932 models.

* * *

Packard are feeling the stimulus of new models. Studebaker is holding up relatively well. Oakland-Pontiac and Oldsmobile have dropped off in production in the past few weeks.

The extent of Ford operations today are perhaps less known than at any time this year. Although July is two-thirds gone, Ford's June production figures have not been made public. Usually they are available early in the month. It would be mere guesswork to hazard a prediction regarding July assemblies, although there apparently has been curtailment of manufacturing activities at the Rouge plant. Ford made a small steel purchase the past week. It was by far the poorest monthly "buy" of the year, and its purpose evidently was to balance stocks in items which were being depleted too rapidly. The steel plant at Rouge, it is understood, may be down for several weeks.

Outlook for Equipment Buying Poor

So far as steel specifications from the automobile industry are con-

cerned, the tonnage has been cut to the bone. The reason is that production has fallen off sharply with no upturn in sight and with the semi-annual inventory period at hand. In many plants, especially automobile body factories, attention is being turned to preparations for 1932 models. This is reflected in a pickup in the business of shops turning out body dies. It is safe to say, however, that expenditures of automobile plants in tooling up for the production of new cars this fall will not be large compared with those of recent years.

The industry is playing a safe game, conserving its financial resources until a time when public buying of automobiles seems assured of attaining such ample proportions that investments in new equipment must be made. Along this line some observers are pointing out that, with possibly a single exception, the cars recently introduced by several makers have few new features to commend them to prospective buyers.

The foundry situation in this district is far from satisfactory. The Chevrolet gray iron foundry at Saginaw is running four days a week, pouring about 1200 tons of iron a day, and Saginaw Malleable division of General Motors is reported operating three days a week. Several small plants in the Port Huron district supplying castings for Plymouth are busy, but foundries at Muskegon are melting considerably less iron than in June.

The work of enlarging and improving the efficiency of the Saginaw Malleable plant is going ahead rapidly and should be completed by the end of September. When General Motors takes most of its malleable castings production away from outside companies and concentrates it at its Saginaw division, it is said that foundries outside the Detroit district will suffer the most, as the main contracts for these castings are in the hands of sup-

pliers in Ohio and other States nearby.

Bright Spots in Automobile Finances

The steel industry will be interested in knowing that Charles M. Schwab, for many years the largest stockholder and a director of the Stutz Motor Car Co., has renewed his financial connection with the company. During the past year Stutz has increased its surplus more than \$2,250,000.

Auburn is believed to have made the most remarkable showing in the industry, with net profits in the months of March, April and May of \$11.06 a share on 195,234 shares outstanding. This compares with \$3.94 a share in the like period of 1930 and \$6.72 in the same months of 1929.

The new Knight car, at a base price of \$845, is powered by a six-cylinder engine and is mounted on a 113-in.

wheelbase. Its features include a double-drop frame, six-port intake manifold, and a new crankcase ventilator. The complete line includes a coach, sedan, Victoria and coupe with rumble seat.

It is believed that there will be few, if any, new models introduced by motor car makers during the remainder of the summer. The next new line to be presented is likely to be the forerunner of the 1932 cars. Meanwhile, automotive executives have settled down to a watchful waiting policy, putting a liberal share of their attention on maintaining sales at as high a level as possible. The low-priced makers are keenly alive to the situation in the Middle West and are ready to push sales with all their resources as soon as the harvesting season gets under way and some money, even though limited in volume, begins to flow into farmers' hands.

Wage Question Delays Illinois Work

Approximately \$25,000,000 worth of public works, mainly highways, scheduled for construction in Illinois in 1931 will be postponed from 6 to 10 weeks under the Prevailing Wage Act passed by the recent session of legislature. Bids had been received before July 1 on \$10,000,000 worth of highway construction work, but the Attorney General's office ruled that these contracts could not be awarded because the bids did not comply with the wage scale act which became effective July 1.

The new law provides that all political units of the State, in advertising for bids on public construction, must provide that the contract shall pay wages equal to the prevailing rate in the community in which the work is to be undertaken. It is the

duty of the political body to ascertain the prevailing wage and the law permits any 10 taxpayers to protest against the fixed scale before a special commission or before the court.

The Chicago Motor Club estimates that approximately 3000 men will be deprived of employment for the remainder of the paving season because of the delay in highway construction.

High Speed Ore Bridge for Edgar Thomson Works

Electric control equipment on a new 15-ton ore bridge at Edgar Thomson works, Carnegie Steel Co., Braddock, Pa., will enable the bridge to move 1000 tons of ore per hr. and to operate 24 hr. a day every day in the year. Designed and built by the Westinghouse Electric & Mfg. Co., East

Pittsburgh, this equipment will be the first such application of the electro-pneumatic contractor type of control. The bridge itself is being designed and built by the Dravo Contracting Co., Pittsburgh, and is to be put in operation this summer.

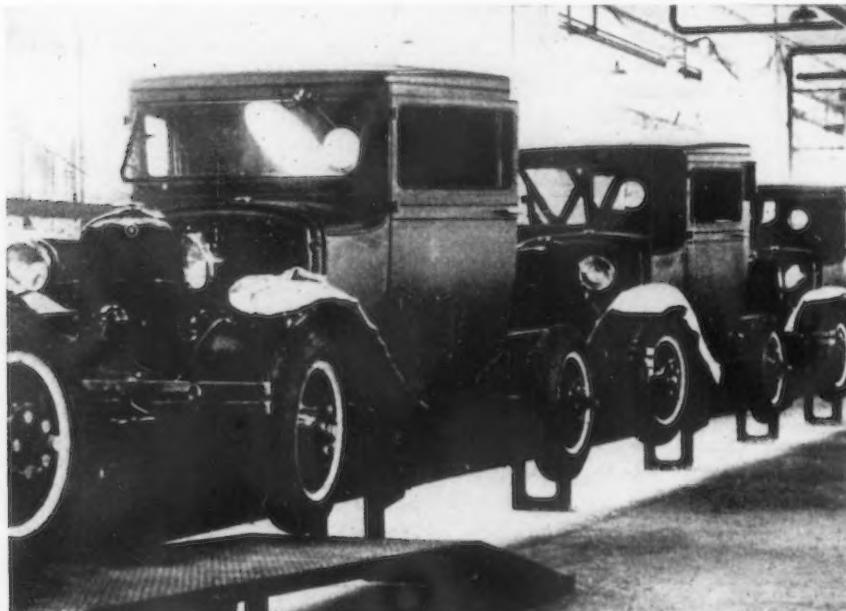
In addition to handling ore from cars to storage pile, this traveling bridge with its 15-ton grab bucket will also carry ore from the storage pile to three blast furnaces. Between cars and storage the bucket will take 34,000 lb. of ore at a bite, lift it an average hoisting distance of 35 ft., and move it an average of 90 ft. to the storage pile, making one round trip every 54 sec. Distance between tracks will be approximately 200 ft. Hoisting speed will be 235 ft. a min.; the trolley can travel along the bridge at the rate of 800 ft. a min., and the bridge will move along the tracks at the rate of 135 ft. a min.

Since a car load of ore contains about 50 tons, this quantity can be moved to storage pile in three trips, or in approximately 3 min., according to the Westinghouse engineers, who say this speed will be due largely to the faster operation made possible by the electro-pneumatic contractor controls.

Bright Anneals Stainless Wire

An annealing process which turns out stainless steel wire, rod and strip with a luster that needs only a minimum amount of buffing to give it a high polish, has been developed by the Alloy Metal Wire Co., Inc., Moore, Pa.

Arthur G. McKee & Co., Cleveland, report net earnings for the first half of 1931 of \$355,415, equivalent to \$4.21 a share on 84,410 shares of common stock. This compares with \$3.47 a share for the same period last year.



266—*The Iron Age*, July 23, 1931

FORD PLANT IN GERMANY NOW IN OPERATION

THE beginning of a procession of Ford units at the new Ford plant, Cologne, Germany, where operations were started in June.



RAILROADS PRESENT ARGUMENTS FOR GENERAL FREIGHT RATE INCREASE

WASHINGTON, July 21.—Stories of weak financial structures that urgently need strengthening by increased revenue, of sharply curtailed programs for the purchase of iron and steel and improved machinery for the maintenance of adequate transportation service and of a continuous battle against economic odds which they could not control were recited by witnesses for the railroads of the country, which last Wednesday began presentation of their plea before the Interstate Commerce Commission for a general advance of 15 per cent in freight rates. At the same time there has developed throughout the proceeding sharply critical questioning of the attitude of the railroads and opposition from different sources to higher rates.

Sitting officially for the Federal commission are three of its members, Commissioner Meyer, who is presiding, and Commissioners Lewis and Lee. Commissioner Eastman also is participating and frequently questions witnesses by way of challenging their statements. Others sitting at the hearings are Examiners Disque, Hosmer and Mattingly of the Federal body, and seven State commissioners. The latter are W. D. Ainey, Pennsylvania; Herbert W. Trafton, Maine; Harvey H. Hannah, Tennessee; Hugh H. White, Alabama; Paul A. Walker, Oklahoma; A. R. McDonald, Wisconsin, and M. J. Carr, California.

The principal witnesses for the railroads have been their executives and representatives of railroad organizations; also investment, insurance, banking, and security interests handling railroad securities and representatives of a number of chambers of commerce. Henry Wolf Bicklé, general counsel for the Pennsylvania Railroad, is acting as chief attorney for the carriers. Lawyers in large number representing shippers opposing the proposed increase in rates are also actively engaging in the hearings.

Seek \$400,000,000 Increased Revenue

The railroads are seeking to increase revenue by \$400,000,000 per year through the proposed increased rates, but opposing interests are gen-

erally taking the position that much of the increase would only tend to divert traffic to competing transportation service, such as truck, oil pipe and water lines. The carriers vigorously maintain that the higher rates would increase revenue and therefore permit them to go into the market to buy needed supplies, thus stimulating business and employment. They are giving recognition to the fact that in some instances higher freight rates would turn traffic to other lines of transportation, provided the latter did not also increase their rates, but have laid down the principle that, while the general proposal is for a 15 per cent increase in rates, adjustments would be made where necessary to meet competition. Nor do they know whether the increase, if granted, would be made permanent.

Special Treatment for Coal and Coke

The only exception to the plan for a general 15 per cent increase in all rates relates to coal and coke. On these commodities, the chief plan is to select a rate group as a basis, increase the rate from it by 15 per cent and add the resulting increase in cents per ton to it and related groups as a means of preserving existing differentials. Some of the proposed increases in rates on coal and coke would actually exceed 15 per cent.

That the commission is trying to speed the case is evident from the fact that it has departed from its original plan of having only the railroad interests and their supporters submit testimony at the initial hearing. It opened the hearing further to the testimony of adversaries who are prepared to present their case. After the present hearing, the proceeding will be adjourned until Aug. 31, when protesting shippers will be heard and given an opportunity to cross-examine railroad witnesses. This hearing also will be held in Washington. Limited hearings will be held outside of Washington.

Dr. J. H. Parmelee, director, Bureau of Railway Economics, was the first witness. He pointed out that "the financial returns of the carriers in 1930 were so discouraging that reductions in capital expenditures were made

during the first quarter of 1931. Gross capital expenditures for the three months of 1931 amounted to \$93,656,000, compared with a corresponding total of \$223,772,000 during the first quarter of 1930." The carriers are faced with bond and equipment trust maturities totaling \$1,300,000,000, which must be met during the next five years, Dr. Parmelee testified.

Edward C. Duffield, president, Prudential Life Insurance Co., and chairman of the Emergency Committee on Railroad Investments of Insurance Companies and Savings Banks, testified that insurance companies and banks would have to decline to buy any more railroad bonds unless rail earnings were increased.

R. H. Aishton, president, American Railway Association, expressed the view that the hope of future economies and efficiencies in operation depends, in major degree, upon a continuation of the policy of replacing the less efficient types of cars, locomotives and other appliances, and in a continual improvement of the operating conditions on the railroads through a liberal expenditure of capital. Regardless of electrical operation and its many desirable features, Mr. Aishton said it is his opinion that it is necessary to depend in large measure for economies in operation on the further development and improvement of locomotives, cars, improved machinery and shops and general maintenance facilities.

"The purchasing power of the railroads in connection with their large capital expenditures is of very vital concern to all lines of industry, including agriculture, and any condition which interferes with the expenditures of the railroads for the advancement of transportation is bound to be reflected adversely upon the general public," said Mr. Aishton.

An exhibit submitted by Mr. Aishton showed that expenditures for equipment in 1930 by Class I railroads totaled \$328,269,000, while expenditures for roadway and structures were \$544,339,000, the combined totals aggregating \$872,608,000. An exhibit submitted by Dr. Parmelee showed that purchases of iron and steel prod-

ucts in 1930 totaled \$329,700,000, the smallest in the five-year period, 1926-1930.

Had to Suspend Improvement Programs

Other railroad executives expressed themselves as did J. J. Pelley, president, New York, New Haven & Hartford Railroad, when he declared that the railroads are not proposing an increase in their freight revenues in an attempt to escape their fair share of the general depression. It was pointed out that the railroads were unable to keep decreased expenses in step with decreased revenues. "If, by loss of earnings and impairment of credit, maintenance and capital expenditures are unduly deferred," said Mr. Pelley, "the railroads may not be in a position with a revival of business to provide the character of transportation that will meet every reasonable demand and expectation."

"It would be highly desirable, in this period of lowered costs, to resume in volume programs of railway improvements which have been largely suspended," said H. A. Scandrett, president, Chicago, Milwaukee & St. Paul Railroad. "Such action at this time would be most helpful in relief of unemployment. However, the credit of the Western carriers is so impaired that few of them could now obtain money for additions and betterments by the sale of their securities at a price which they, or the commission, would regard as in keeping with prudent management. In the case of the Milwaukee road, plans were made for the purchase of 40 modern freight locomotives and the application of boosters to 25 locomotives now owned. This program, which had to be abandoned because of the unfavorable situation, would have resulted in savings of \$639,292 per year. On account of the drastic decline in revenues it was necessary for the Milwaukee road to cancel from its 1931 budget, for additions and betterments, expenditures amounting to \$4,518,000, of which \$1,635,634 would have produced estimated savings of \$333,516, or 32 per cent. I know from conversations with officers on other lines that many, if not all of them, have been forced to curtail similarly their improvement programs and for the same reason that forced our action on the Milwaukee."

Increased Rates on Coal and Coke

Roy S. Kern, chairman of the Coal, Coke and Iron Ore Committee of the Central Freight Association lines, discussed the proposed increase in rates on coal and coke. An instance is that of lake cargo coal. It is the proposal to increase these rates 15 per cent of the weighted average of rate of \$1.71 per ton for the season of 1930, thus adding 26c. and maintaining existing differentials. Charges for dumping from cars to vessels, now 8c., would be increased 15 per cent, or 1c. a ton, the fractions to be disregarded if less

than $\frac{1}{2}$ c. and the next number to apply if over that amount.

The base rate group mostly used under the system is the so-called Inner Crescent, including Pittsburgh and Connellsville in western Pennsylvania, Fairmont in northern West Virginia, Kanawha, and Thacker and Kenova in southern West Virginia and portions of Kentucky.

Citing an example of application of the method, Mr. Kern pointed out that to Toledo, Ohio, rates are \$1.89 from the Ohio district, \$2.39 from the Inner Crescent and \$2.64 from the Outer Crescent. Applying 15 per cent to the Inner Crescent rate, the result is 36c. which would be added to each of the groups, making rates of \$2.25, \$2.75 and \$3 respectively. The Pittsburgh rate would be used as the basis for calculating the advance in a number of instances.

On beehive coke it is proposed to advance the Connellsville rates 15 per cent and to add the same amount of advance in cents per net ton to all related districts. Rates on by-product coke within this territory are generally made on or with relation to mileage and it is proposed to increase these rates by applying a 15 per cent advance to each rate except in the instance of the following:

By-product coke rates from Clairton and Pittsburgh to the Mahoning and Shenango valleys, Cleveland, etc., provide for a differential between such origins of 10c. per ton and it is proposed to preserve the differential by computing the suggested advance on the Clairton rates and adding the same amounts of increase to the rates from Pittsburgh.

In connection with by-product coke rates within Central Freight Association territory, the carriers now have before the commission a proposal to adjust them on the basis of a mileage scale. It is proposed to file supplements to the suspended schedules advancing each rate 15 per cent.

Commissioner Eastman questioned Mr. Scandrett at considerable length regarding the proposal of carriers to reduce short haul rates on iron and steel products in Central Freight and Trunk Line territories and also about rates that the carriers had voluntarily reduced on automobiles, cotton oil, and other products. Mr. Eastman asked

if the carriers proposed to make subsequent adjustments in differentials existing between the various groups of these products if rates were increased. "The rates would be increased 15 per cent initially, and adjustments would be made later, if necessary," replied Mr. Scandrett.

When he was asked about the ability of agriculture to pay increased freight rates, Mr. Cole expressed the opinion that "if the railroads tomorrow offer to haul wheat free it would make no difference in the price of the commodity." He added that the trouble with wheat, as with other commodities, is overproduction.

International Congress on Testing Materials

An international congress of the new International Association of Testing Materials will be held in Zurich, Switzerland, Sept. 6 to Sept. 12. Activities have been divided into four groups—metals, non-metallic inorganic materials, organic materials and questions of general importance.

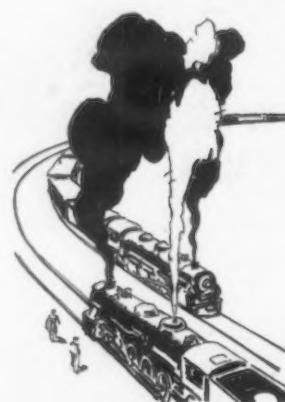
To judge from the preprinted program, papers will be presented in English, German and French. The chairman of the metals group is Dr. W. Rosenhain, National Physical Laboratory, Teddington, England. Under his chairmanship 23 papers or reports are already scheduled, prepared by recognized authorities, mainly in Europe, but with some contributors from the United States. The permanent committee of the association includes representatives from 18 countries, 17 of which are in Europe.

Kitchenware Makers Unite

Savory, Inc., and the Central Stamping Co. have been united under a single control. Interests affiliated with the Republic Metalware Co., which owns and operates Savory, Inc., are reported to have purchased a majority of the Central Stamping capital stock.

The Savory organization's factories are located in Buffalo, N. Y., and manufacture specialties for the kitchen. The company was founded in 1836 under the name of Sidney Shepard & Co., and in 1905 was incorporated as the Republic Metalware Co. C. Sidney Shepard is chairman of the board.

The Central Stamping Co., of which E. M. Blake is president, grew out of the original tinware factories of Nathaniel E. James in Newark, N. J., and E. Ketcham & Co. in Brooklyn, N. Y., the former established in 1834. The company in Newark produces kitchenware for household and institutional use.



Russia Held Not a Potential Competitor in Steel Products

IN connection with the departure from New York on July 16 of a group of engineers of Arthur G. McKee & Co., Cleveland, for Russia, to augment the force which has been operating in that country for more than a year, R. E. Baker, secretary and treasurer of the company, discussed the problem of future Russian competition in iron and steel with those countries now dividing the export trade. Officials of the McKee company gave no weight to the fears of Russian competition with the rest of the world on manufactured goods.

"Distances are great and transportation is poor in Russia," says Mr. Baker. "I am convinced that it will be many years before Russia can take care of her own primary needs and that, if the Government attempted to ignore those needs, it would cost them so much to get their own manufactured goods to their borders that they would be beaten in competition before they started.

"When one realizes that this great steel plant at Magnitogorsk, with a steel capacity of 2,100,000 tons of open-hearth and Bessemer steel a year, could put that whole capacity into steel rails for the whole life of the plant without producing enough

to give Russia a competent transportation system, one quits worrying about Russia being any menace even to her industrial neighbors in middle Europe, to say nothing of the rest of the world.

"Economically, neither Magnitogorsk nor Kuznetsk holds any actual or potential threat for the iron and steel industries of Europe, much less those of the United States. Our firm has designed and built, in whole or in part, some of the principal iron and steel plants of India and China, and neither of the Russian plants mentioned is likely ever to compete successfully in either of those countries.

"In recent years iron from India has been profitably sold in central Pennsylvania and Cincinnati, and Chinese iron can probably determine the market price on the Pacific Coast, even at today's prices. The Magnitogorsk and Kuznetsk plants can be worn out and the immediate raw material supplies exhausted, and still leave a considerable future demand for steel in Russia.

"Although a tremendous volume of construction work remains to be accomplished on the major iron and steel plants now under construction in Russia, the greatest problems of the

Russians in respect to Magnitogorsk and similar major projects relate to operation and management. These will prove real problems, and I cannot now foresee how they will be met."

▲ ▲ ▲

Oil Burner Makers Confer in Toronto

A conference of the American Oil Burner Association (headquarters, 342 Madison Avenue, New York) was held recently in Toronto. Walter F. Tant, president of the association, stressed the need for close cooperation with dealers as a means of promoting sales and improving service. He further stated that the marked increase in business reported by a number of manufacturers of oil-burning equipment indicated that the low point in the industry had been passed several months ago.

At a meeting of the association directors, Arthur W. Clark, former vice-president of Wayne Home Equipment Co., Fort Wayne, Ind., was appointed managing secretary of the newly created dealer division. The directors, declaring that any tariff or embargo on petroleum is contrary to the principles of conservation and against public policy, went on record as opposed to such measures.

It was decided at the meeting to hold the ninth annual convention and oil burner show in Boston in April, 1932.



NEW TYPE ARMORED CAR

THIS latest type armored car, recently tested at the Aberdeen Proving Grounds, has a speed of more than 55 miles per hr. It is equipped with two guns for lateral fire and one anti-aircraft gun, has a four-wheel drive and is protected by $\frac{5}{8}$ -in. armor plate.

▼ ▼ ▼

Canada Produced Fewer Cars in June

Automobiles produced in Canada in June are reported by the Dominion Bureau of Statistics, Ottawa, at 6835 units, of which 5583 were passenger cars and 1252 were trucks. This was a sharp decline from the May production of 10,622 passenger cars and 2117 trucks, a total of 12,739.

Of the June output 1115 units were for export. During June exports totaled 1084 cars and imports 647 cars.

Production in the first half-year was 66,085 cars, against 110,685 cars in the first half of 1930. The falling off has been most severe in passenger cars, which dropped 43½ per cent, from 93,359 to 52,811. Trucks meanwhile declined 23½ per cent, from 17,326 to 13,274.

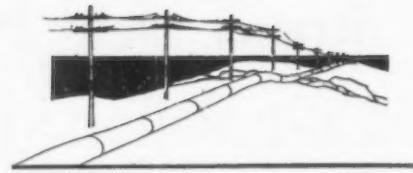
Railroads Complete Rate Testimony

WASHINGTON, July 21.—Presentation of the testimony for the railroads and those supporting them in their plea for a 15 per cent rate increase was completed today before the Interstate Commerce Commission. Following arguments this afternoon regarding further proceedings, Chairman Meyer said that the commission would make an announcement "as expeditiously as possible." It is believed that the commission will proceed with its original program, which provides for resumption of hearings Aug. 30, when shippers will present opposition to the proposed increase and will cross-examine railroad witnesses. The schedule as prepared also

calls for limited hearings outside Washington.

Grenville Clark, attorney for holders of railroad securities, urged the commission to expedite hearings by continuing without adjournment until all evidence is in. He asked that commission hand down decision by Sept. 1. Henry Wolf Bickle, attorney for the railroads, however, suggested hearings proceed until Aug. 15 and adjournment be taken for two weeks when they would be resumed.

Shippers' attorneys opposed both plans and asked that the commission go ahead with original program. Only one "adverse" witness against plea of railroads was heard. The fact that others were not heard was said to be due to their not being prepared to submit opposition evidence.



PIPE LINES

Braman Oil Co., Philtower Building, Tulsa, Okla., has acquired system of Mayes County Pipe Line Co., and will operate as a subsidiary. Company is planning installation of pipe lines for natural gas service at Pryor, Okla., and vicinity.

Northern Natural Gas Co., Hugoton, Kan., affiliated with Republic Gas Corp., has placed contract with Youngstown Sheet & Tube Co. for about 200 miles of 26-in. pipe, for new natural gas lines in southwestern part of Kansas.

United Gas Co., Houston, Tex., has begun construction of a new pipe line for natural gas service at Opelousas, La., and vicinity, to cost about \$125,000.

New York Department of Water Supply, Gas and Electricity will open bids Aug. 4 on a 72-in. pipe line for water in the Bronx requiring 570 tons.

Great Lakes Pipe Line Co., Kansas City, Mo., now plans to extend its gasoline pipe lines to Omaha, Neb., and Council Bluffs, Iowa. It is planned to tap the trunk line carrying gasoline from Oklahoma to refineries at Kansas City, Des Moines, Chicago and St. Paul with a 4 in. line to Council Bluffs.

The Buffalo & Niagara Eastern Power Co. has placed 460 tons of pipe for Utica, N. Y., with Farrar & Trefts, Baltimore.

Buy Fowler & Wolfe Radiator Plant

Adam E. Geddes, former vice-president, American Radiator Co., and Basil N. Greenlar, former manager of that concern's Bayonne, N. J., plant, have purchased the Fowler & Wolfe Mfg. Co.'s radiator plant at Norristown, Pa., and will operate under the name of Fowler & Wolfe Mfg. Co.

Black & Decker Mfg. Co., Towson, Md., has been awarded the Baltimore Safety Council bronze trophy for winning a safety campaign, conducted by the council, among 79 manufacturing plants in the Baltimore district. For the past six months, the Black & Decker company had a perfect record, with no lost-time accidents.

Asks Associations to Work for Employment

WASHINGTON, July 21.—Plans for further cooperation of trade associations in stimulating employment in each industry which they represent were announced last Saturday by Fred C. Croxton, acting chairman of the President's Emergency Committee for Employment. A number of trade associations have been actively cooperating with the committee but additional and more specific lines of cooperation are required in a letter sent out to leading associations throughout the country.

The program covers both the requirements of the present emergency and also the problem of long-time planning to prevent unemployment in the future.

Mohican Steel Co., Inc., 300 Mese-role Street, Brooklyn, has been organized as a warehouse distributor of flat steel, specializing in shearing and cutting of hot-rolled and cold-rolled coil stock. J. L. Sussman is president, and Aaron Barashick is secretary-treasurer.

SOURCES OF PRODUCTION AND AVENUES OF DISPOSAL*

(Millions of Dollars)

Production in United States in 1929		\$93,354
Manufacturing	\$69,418	
Farming	15,924	
Mining and Quarrying	4,795	
Forestry	1,097	
Fishing and Hunting	120	
Restaurant Products	2,000	
Imports		4,399
Total Available		\$97,753
Exports		5,157
United States Consumption		\$92,596
Used at Source	\$ 5,888	
Domestic Commerce	86,708	
Entering Domestic Commerce		\$86,708
Consumed by Industry		52,708
Manufacturing	\$34,208	
Service	18,500	
Consumed by Households		\$34,000

*Calculations made from compilations of the Department of Commerce.

PERSONALS

L. A. PADDOCK, vice-president since 1927 of the American Bridge Co., New York, has been elected president, succeeding the late Joshua A. Hatfield. Immediately after being graduated from the University of Michigan in 1904 as a civil engineer, Mr. Paddock became identified with the Canadian Bridge Co., Walkerville, Ont., of which he became president in 1924. ARTHUR L. DAVIS, who has been general sales manager of the company, has been made vice-president, in charge of sales, with offices in the Frick Building, Pittsburgh.

❖ ❖ ❖

C. S. EATON, of Cleveland, has resigned as a director and member of the executive committee of the Youngstown Sheet & Tube Co., Youngstown. FRANK PURNELL, president of the company, has been elected a member of the executive committee to succeed Mr. Eaton, and GEORGE T. BISHOP, JR., president of Continental Shares Co., Inc., Cleveland, has been made a director.

❖ ❖ ❖

E. O. WILLIAMS, formerly manager of the Howe Chain Co., has been placed in charge of the Philadelphia office of the Union Chain & Mfg. Co., Sandusky, Ohio.

❖ ❖ ❖

T. J. PACE has been appointed assistant to vice-president, in charge of market planning and research analysis, for the Westinghouse Electric & Mfg. Co., East Pittsburgh. M. B. LAMBERT has been named sales manager in charge of the transportation department; O. F. STROMAN, sales manager in charge of the industrial department, and R. A. NEAL, sales manager in charge of the central station department. In announcing these appointments, J. S. TRITTLE, vice-president and general manager of the Westinghouse company, stated that changed economic conditions had required constructive realinement of all departments in order that the company might serve its customers more effectively.

Mr. Pace has been director of sales since 1926. He joined the Westinghouse organization in 1902 when the Manhattan General Construction Co., of which he was assistant general manager, was absorbed by the Westinghouse company. In 1905 he was made manager of the illuminating section and in 1922 became manager of the supply sales department. Mr. Neal went with the company in 1910, following graduation from the University of New Hampshire. He was made manager of the switch section

in 1920 and switchgear apparatus manager in 1926.

Mr. Stroman has been associated with the Westinghouse company since 1903. From 1906 to 1909 he was in the power sales department, in 1912 he was made assistant to the manager of the industrial sales department and in 1926 he was appointed motor apparatus manager. Mr. Lambert has spent his entire business career in the transportation field. Before joining the Westinghouse company in 1900, he spent some years in the operating service of New York District Railways.

❖ ❖ ❖

M. C. TERRY has been appointed chief refrigeration engineer for the Westinghouse Electric & Mfg. Co., East Pittsburgh, and will have headquarters at East Springfield, Mass. In his new capacity Mr. Terry will report to T. S. PERKINS, general manager of merchandising engineering. J. H. ASHBAUGH, assistant manager of the Westinghouse refrigeration engineering department, will be in executive charge of that department.

❖ ❖ ❖

J. A. DOUCETT, vice-president and assistant general sales manager of Revere Copper & Brass, Inc., New York, has been appointed vice-president and general sales manager. Previously he was president of the Michigan Copper & Brass Co., now the Michigan division of the Revere company. Mr. Doucett was at one time associated with the America Brass Co. VINCENT W. ALLEN, heretofore works manager of the Michigan division, has become manufacturing manager, with headquarters at Rome, N. Y.

❖ ❖ ❖

FRANK E. CLARK, of the H. A. Brassert Co., Chicago, returned on July 20 from an 11 months' stay in Great Britain.

❖ ❖ ❖

H. O. McCULLY is now president of the Erie Bolt & Nut Co., Erie, Pa., succeeding LINCOLN DAVIS, who has retired from active participation in the business.

❖ ❖ ❖

GEORGE W. COBB, general manager of sales of the American Can Co., has been elected a director of the United States Pipe & Foundry Co., Burlington, N. J.

❖ ❖ ❖

J. S. FERGUSON, formerly manager of the Columbus, Ohio, plant of the American Rolling Mill Co., sailed for Russia on July 17, as blast furnace

consultant on the staff of the Frey Engineering Co., Chicago. He will be located at Kuznetzk, Siberia. Mr. Ferguson has been identified with the American Rolling Mill Co. since 1921.

❖ ❖ ❖

LE ROY K. ARMSTRONG, formerly assistant manager of Fales & Jenks Machine Co., Pawtucket, R. I., which has been merged with the Whitin Machine Works, has become identified with the domestic oil burner sales department of the Timken-Detroit Co., Providence.

❖ ❖ ❖

C. G. BUNNEL, for some years purchasing agent at the East Pittsburgh works of the Westinghouse Electric & Mfg. Co., has been appointed general purchasing agent for the company, and will report directly to the general works manager to secure proper coordination of buying procedure.

❖ ❖ ❖

ALEXANDER TAYLOR, assistant to the vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has been assigned to special duties concerned with the company's Pennsylvania Railroad locomotive contract, according to an announcement by J. M. HIPPLE, recently elected general works manager for the Westinghouse company. Supervision of Mr. Taylor's former activities have been delegated to H. C. THOMAS, director of manufacturing stocks. E. R. NORRIS has been named assistant to the general works manager.

▲ ▲ ▲

Educational Vacation for Adult Engineers

An arrangement for ten days' vacation with educational features has been made jointly for the alumni of Stevens Institute of Technology and the engineering graduates of Columbia University. An encampment for the purpose near the Delaware Water Gap begins Aug. 29. Guest lecturers are to touch on economics and business finance. Engineering alumni of other institutions are invited and should write to James Creese, Stevens Institute of Technology, Hoboken, N. J.

▲ ▲ ▲

United States Pipe & Foundry Co., Burlington, N. J., reports net earnings, after deductions, of \$913,954.03 for the first half of this year. This compares with net profit of \$1,525,931.96 for the same period of 1930.

▲▲▲ OBITUARY ▲▲▲

CHARLES H. GRADY, died July 17, after an illness of several months. He had served the Illinois Steel Co. and affiliated companies for 38 years and at the time of his death was manager of the raw material department of the Illinois Steel Co.

❖ ❖ ❖

WARREN J. DAVIS, former president, J. I. Case Threshing Machine Co., Racine, Wis., and widely known industrialist and financier, died at Harbor Hospital, New York, on July 11, aged 75 years. He was born in San Francisco and went to Chicago in boyhood, later entering the lumber business, and becoming a banker at Marinette, Wis. In 1908 he went to Racine to become cashier of the former Manufacturers National Bank, afterward serving as president. He became head of the Case company in 1916 and resigned as chairman of the board in 1926.

❖ ❖ ❖

JESSE B. GARBER, for the past 32 years general superintendent of the Deming Co., Salem, Ohio, died at the Youngstown City Hospital on July 3, from the effects of injuries suffered in an automobile accident in March. He learned the machinist trade at the plant of the Buckeye Engine Co. and became identified with the Deming Co. in 1885. Mr. Garber was 69 years old.

❖ ❖ ❖

LEO I. HEINTZ, president of the Heintz Mfg. Co., Philadelphia, died on July 8.

❖ ❖ ❖

GEORGE S. SCOVEL, executive and leader in the metal and supply trade of California for the past four decades died July 11 at San Francisco, aged 71 years. Mr. Scovel entered the metal and hardware business as a young man at St. Louis with the Paddock-Hawley Iron Co. Nearly 40 years ago he moved to California and was partner in the Lloyd-Scovel Iron Co. In 1908, with his brother, Mr. Scovel organized the George S. and H. H. Scovel Co., later incorporated as the Scovel Iron Store Co. This business was consolidated to form the Waterhouse, Weinstock, Scovel Co. in 1927 and since that time Mr. Scovel has served alternately as president and chairman of the board. He retired from active business because of his health in February of this year. He is survived by two sons, George H. and J. Daine Scovel, both of whom are active in the business, George H. being president.

❖ ❖ ❖

LEE HOWARD HOSKINS, for 30 years associated with Crocker Brothers and later with Rogers Brown & Crocker Brothers, most of that time traveling the eastern Pennsylvania territory, died suddenly July 16, aged 52 years.

▲▲▲

Canadian Iron Output Up; Steel Falls

Production of pig iron in Canada in June amounted to 55,822 gross tons, an advance of 11 per cent over the total of 50,511 tons in May, but 16 per cent less than the 66,081 tons reported for June, 1930. Output of

foundry iron in June advanced to 10,133 tons from 5372 tons in May and 7708 tons of malleable was made, whereas no malleable was produced in the previous month. Basic iron, however, dropped from 45,139 tons in May to 37,980 tons in June.

In the first half year production of pig iron totaled 299,222 tons, which compares with 451,186 tons in the first

half of 1930 and 518,557 tons in 1929.

During the month, one furnace was banked at Sault Ste. Marie, Ont., and one was blown in at Port Colborne, leaving four furnaces in blast at the end of the month. The active furnaces had a capacity of 1900 tons a day.

Production of ferroalloys in June at 2740 tons was above the May output of 2540 tons. For the six months production aggregated 22,884 tons, compared with 44,960 tons in the like period last year.

Output of steel ingots and direct steel castings in June was at the lowest rate of the year, at 55,605 tons. This was 26 per cent below the 75,235 tons reported for May and compares with 95,312 tons produced in June, 1930. For the six months, production totaled 461,877 tons, compared with 636,613 tons in June a year ago and 738,842 tons in June, 1929.

▲▲▲

Labor Turnover Shows Less Employment

Turnover of labor in June, as reported by the United States Bureau of Labor Statistics, shows a separation of 5.09 per cent of the number on payrolls and accessions of only 2.41 per cent. This represents a net decline of 2.68 per cent in employment during the month. Only in boots and shoes, in clothing and in slaughtering was the accession rate higher than the separations, although the brick industry showed practically a stand-off.

Worst hit of all was the automobile industry—11.68 per cent separation and 2.91 accession. Foundries and machine shops lost 5.38 per cent of their employees and took on 1.95 per cent. Iron and steel mills showed a separation rate of 3.62 and accession of 1.20 per cent.

More than three-fourths of the entire separations consisted of temporary layoffs. Discharges amounted to only 0.23 per cent, while voluntary quits were 1.02 per cent. These ratios, somewhat modified, followed down through the list of metal industries.

DENSITY OF MANUFACTURING BY SECTIONS IN 1929

States	Percentage of Population	Percentage of Manufactures	Manufactures Divided by Population
Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut	6.7	9.15	136.6
New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia	23.3	32.31	138.7
Ohio, Michigan, Indiana, Illinois, Iowa, Wisconsin, Kentucky, West Virginia	26.2	33.45	127.7
Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama	11.7	5.60	47.9
Missouri, Tennessee, Arkansas, Oklahoma, Texas, Louisiana, Mississippi	16.6	7.98	48.1
Nebraska, Kansas, Colorado, Wyoming, Montana, North Dakota, South Dakota, Minnesota	7.3	4.55	62.3
California, Oregon, Washington, Idaho, Nevada, Utah, Arizona, New Mexico	8.2	6.96	84.9

Reinforcing Steel

Lettings the Largest in Several Weeks

AWARDS of reinforcing steel the past week totaled 9650 tons, the largest for any week since April 2. Contracts included 2950 tons for anchorages and piers for the Golden Gate bridge at San Francisco and 2600 tons for the Illinois Terminal warehouse at St. Louis. About 4900 tons is added to pending projects, compared with 4000 tons in the previous week. The largest new job, 1200 tons, is for the Commonwealth Edison Co. at Chicago. Awards follow:

PENNSYLVANIA RAILROAD, 530 tons, reinforcement in bases for catenary supports between Wilmington, Del., and Washington; 190 tons to Truscon Steel Co., 180 tons to Concrete Steel Co. and 160 tons to an unnamed bidder.

STATE OF NEW JERSEY, 150 tons, highway construction at Newton, route 31, section 9, to Kalman Steel Co.

NEW YORK CENTRAL RAILROAD, 300 tons, sewer construction on Eleventh Avenue, New York, to an unnamed fabricator.

HORNELL, N. Y., 100 tons, reservoir, to Jones & Laughlin Steel Corp.

SHEBOYGAN, WIS., 100 tons, hospital, to Calumet Steel Co.

MILWAUKEE, 375 tons, packing plant for Swift & Co., to Olney Dean & Co.

ROCKFORD, ILL., 100 tons, newspaper building, to Kalman Steel Co.

CLEVELAND, 700 tons, Belvoir Boulevard culverts, to Concrete Steel Co.

CHICAGO, 300 tons, Children's Memorial Hospital, to Joseph T. Ryerson & Son, Inc.

CHICAGO, 100 tons, Forest Preserve swimming pool, to Joseph T. Ryerson & Son, Inc.

CHICAGO, 750 tons, Western Electric Co. to American System of Reinforcing; previously reported to an unnamed bidder.

ST. LOUIS, 2600 tons, Illinois Terminal warehouse, 1300 tons each to Laclede Steel Co. and Missouri Rolling Mills Corp.

SAN FRANCISCO, 1250 tons, Golden Gate bridge approach piers, to Pacific Bridge Co.

SAN FRANCISCO, 1700 tons, Golden Gate bridge anchorages and piers, through Barrett & Hilp, general contractors, to an unnamed bidder.

ALBUQUERQUE, N. M., 500 tons, Veterans' Hospital, to an unnamed bidder.

ANTHONY, N. M., 500 tons, Federal prison, to an unnamed bidder.

LOS ANGELES, 340 tons, Albro Place viaduct, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

WESTCHESTER COUNTY, N. Y., 350 tons, highway construction for County Park Commission; John Arborio, Poughkeepsie, contractor.

MIDDLETOWN, N. Y., 150 tons, State hospital.

JERSEY CITY, N. J., 100 tons, State armory.

PENNSYLVANIA RAILROAD, 324 tons, station at Thirty-second Street, Philadelphia; bids in.

WALLKILL, N. Y., 270 tons, State prison; Wark Construction Co., Philadelphia, general contractor.

NEW YORK, 200 tons, Parcel Post building; bids opened Aug. 20 by supervising architect, Treasury Department.

CHILLICOTHE, OHIO, 140 tons, industrial reformatory; Jones & Laughlin Steel Corp., low bidder.

SOUTH BEND, IND., 500 tons, Post Office.

LAFAYETTE, IND., 100 tons, Post Office.

CHICAGO, 1200 tons, two projects for Commonwealth Edison Co.

CHICAGO, 250 tons, Post Office; bids opened Aug. 10 by supervising architect, Treasury Department.

MADISON, WIS., tonnage not stated, United States Forest Products laboratory.

SAN FRANCISCO, 280 tons, State Harbor Board, warehouse on Pier 38.

ALAMEDA COUNTY, CAL., 110 tons, Sunol Dam; Barrett & Hilp, general contractor.

SACRAMENTO, CAL., 900 tons, six State highway projects.

LOS ANGELES, 125 tons, Santa Fe Railroad hospital.

SAN DIEGO COUNTY, CAL., 118 tons, paving; bids close July 29.

Railroad Equipment

Chicago, Burlington & Quincy has ordered one gasoline-electric switching locomotive from Whitcomb Locomotive Co., subsidiary of Baldwin Locomotive Works.

Fonda, Johnstown & Gloversville is inquiring for six interurban cars.

New York Central Railroad has placed 200 container cars and 1200 containers with the American Car & Foundry Co.

Northern Pacific will take bids Aug. 1 on 500 underframes and car sets of superstructure parts.

American Railroad Co. of Porto Rico recently took figures on 100 steel sugar cane cars.

Carnegie Steel Co. has revived inquiries for 30 hopper car bodies and repairs to 30 hopper cars.

The Rockford Bolt Co., organized 68 years ago, one of the pioneer industrial establishments in Rockford, Ill., has been reorganized as the Rockford Bolt & Steel Co., with F. W. Gaffney, president; H. Sadewater, vice-president; R. J. Gaffney, secretary, and J. C. O'Connor, treasurer. S. J. O'Connor, for the past ten years general manager of the factory, recently completed his forty-fifth year of consecutive service with the firm.

Structural Trade Rules Accepted

WASHINGTON, July 21.—The Federal Trade Commission today promulgated trade practice conference rules for the structural steel fabricators' industry. The rules had previously been accepted by the industry following a number of changes of wording suggested by the commission.

The commission declined to approve or accept one Group 1 rule and four Group 2 rules. Group 1 rules cover practices which are illegal. Group 2 rules cover those which are accepted as expressions of the trade.

Ten Group 1 rules and four Group 2 rules were accepted. The Group 1 rules cover substitution of materials inferior to those specified by purchasers; using manufacturing methods not in accord with Governmental rules; selling goods below cost with the intent of injuring a competitor; secret payment of rebates; defamation of competitors; inducing breach of contract; discrimination in price; false advertisement of quality and grade of products; aiding and abetting another in use of unfair trade practices; and deviation from established standards of the industry.

The Group 2 rules accepted relate to minimum standards of structural designs; standard form of contract; committee of trade practices; and definitions of the following: the industry, a distributor, a mill, a warehouse, a fabricator and an erector.

New Trade Publications

Open-Hearth Reversal Apparatus.—Leeds & Northrup Co., Philadelphia, Bulletin No. 841, 16 pages, describes operation and features of the company's automatic temperature-difference reversal apparatus for open-hearth furnaces. The reversal occurs automatically whenever the difference in temperature between the ends of the furnaces has reached a predetermined degree. It is actuated by pyrometer thermocouples and provided with a recording potentiometer pyrometer.

Bearings.—Johnson Bronze Co., New Castle, Pa. Folder illustrates new graphite impregnated, self-lubricated bushings of cast phosphor-bronze and rolled sheet metal.

Molding Machines.—Herman Pneumatic Machine Co., Zelienople, Pa. Circulars describing automatic fluid timing valve for jarring machine; also description and engineering report of "Hi-Speed" jarr rollover and pattern drawing molding machine.

Speed Reducers.—W. A. Jones Foundry & Machine Co., 4401 West Roosevelt Road, Chicago. Book devoted to worm gear speed reducers contains selection data, installation illustrations and instruction, and price lists.

The German Crisis

GERMANY'S present troubles are fiscal rather than physical. German wealth is not impaired, her physical assets are sound, and her ability to compete in the manufacture and sale of goods is superior. Her present troubles reflect extravagant living, misuse of credit, and political mischief. What we are saying is merely a paraphrase of recent statements by Dr. Luther and Dr. Schacht, and of previous statements by S. Parker Gilbert, who gave ample warning of the debacle.

Germany has been traveling the socialistic road, governmentally operating many of its social services, which has been wasteful as always it is. German bankers have been opportunist, borrowing on short-term credits and re-lending on long-term. German politicians have threatened communism on the one hand and fascism on the other, and each has spelled repudiation and reoccupation of the country by the French. No wonder, therefore, that persons with credit should transfer it to other countries where it would be safe, and so was the present crisis precipitated. The relief of Young-plan obligations was insufficient to avert the trouble.

Germany now needs help in the form of long-term credit. It can get it by renouncing its nonsense and submitting to the review and veto of its benefactors. Its economy is sound enough but its politics are crazy. The fate of Germany is to work, in which there may be perfect happiness, but it must get rid of a lot of its socialism. It may get rid of its penalizing reparation obligation, which is perhaps more sentimental than back-breaking, but before doing that it must recognize that its present troubles are chiefly of its own making and not an outcome of the war except in so far as that led to domestic mismanagement. If the rest of the world now goes to the rescue it may reasonably impose severe terms of financial, and perhaps political, control, for socialism is not to be trusted.

Artificial Purchasing Power

DURING 1930 we had a great exercise of artificial purchasing power on the part of the public service corporations under the instigation of Washington, but we now are able to see clearly that it made things worse for construction in 1931, and for all the metals that enter into construction. Steel, copper, lead and zinc are at their nadir with the mid-year of 1931 right at hand.

Recently our Government loaned the veterans ap-

proximately 800 million dollars which was added to the purchasing power of the consuming public without having any beneficial effect.

Dr. Glenn Frank, who is an exponent of the collegiate and clerical mode of thought, recently declared that the masses of the American people must obtain a larger share of the nation's income. Dr. Frank is at least sane in not urging the distribution of a larger income than exists. If the national income of 84 billion dollars in 1929 shrunk to 70 billion in 1930, of course the latter is all that by any possibility can be distributed. Without entering into discussion of the division of income we may at least suggest that stockholders who receive dividends, if when and as they are so fortunate, are also spenders and as such are employers of labor.

Competition in Steel Costs

DURING this depression there has been a gradual but more and more marked change in the philosophy or policy of the steel trade in what may be called broadly the matter of competition. It may be said that there is more thought as to the future and less as to the immediate present, that to fortify for the future by effecting rigid economies is of much more value than to secure for the present such little orders as are obtainable.

Of course unit cost is reduced by securing a larger operation, but the benefit is only temporary at best and if there is price cutting the cutter suffers in the long run substantially as much as competitors. Some producers have lately found, moreover, that price cutting is not always favorably received by buyers.

There has been a change in the attitude of many buyers, who are wearied of uncertain and unstable markets. For their own protection they have been disposed to seek the lowest prices going and the only way is to test the firmness of the one who is quoting. Eagerness to develop the lowest price possible has sometimes led to the use of reprehensible methods, the seller being induced to meet what is only a phantom cut whereby he becomes the original cutter. It is asserted that such buyers have reformed, more or less, and that sellers find it easier than formerly to maintain prices, while they are certainly more anxious to do so.

There has been a general preachment in the present economic situation that one great help in getting out is reduction of costs by everybody. The steel industry is now doing its best in this respect and today it is a matter of reducing costs under a low oper-

ating rate when in the past the thought was chiefly along the line of reducing costs when there was a full or nearly full operation.

A large part of the increase in steel-making capacity in the last few years has been an increase sought not for the direct outcome but for the purpose of reducing unit costs. Ingot capacity has increased 30 per cent in the last nine years and 100 per cent in the last 18 years.

Some of the economies now being introduced are labeled more or less distinctly as being temporary, to meet the situation. Some obviously are so. Others are likely to prove to be permanent after all.

No doubt there was a feeling last year on the part of some producers that if they did not keep abreast of competitors in the matter of operation they would be getting on a tack that would lead eventually to complete elimination. There is less disposition now to look at the matter that way. There are cases of orders being passed up on account of price, or alleged price, when last year they would not have been. All told the steel trade is in a healthier condition as to its philosophy. It is felt that conditions at present are too bad to worry about and the big thing to do is to prepare for the future.

▲▲▲

The Consumer's Opinion

IN a recent speech Senator Wagner declared that "an employer of labor or a captain of industry can today be guilty of no more violent act of industrial sabotage than by instituting a policy of wage deflation. By doing so he literally throws a monkey wrench into the economic machinery of the country. Thereby he destroys efficiency, reduces standards of living and diminishes purchasing power. In other words, he is eliminating every factor which possesses the power to speed the recuperation of American business."

Now what would the senator say in respect to plant personnels who themselves propose reduction of wages in order to preserve work for themselves?

And what would he say in respect to mine owners who have turned their properties over to their men with permission to them to get their living out of them if they can.

Well, both of those things have happened in numerous instances during the past year.

The master-builder does not want to reduce wages except in so far as it enables him to sell more houses. Matthew Woll says that the building mechanics do not yet get enough, not even according to the scale of May 1, 1929, which still nominally prevails. The public that needs houses thinks otherwise.

▲▲▲

THE Russians say boastfully that they have a plan. It appears to be borrowed from the plan that we had during the war. We were not satisfied with the working of our plan under bureaucratic administration and we scrapped it as soon as we could, but not soon enough. It caused us a loss of

\$3,000,000,000 in shipbuilding, messed up our railways and did other mischiefs. Are the Russian bureaucrats supermen?

▲▲▲

Wage Rates and Wages

IN the continued discussion of the pros and cons of wage reductions the differences are more a variance in emphasis on terms than disputes about facts. President Green of the American Federation of Labor keeps on proclaiming the uncompromising stand of "American labor"—meaning the organized minority of labor—"against all attempts to lower living standards" by reductions in wages. At the same time those who write of conditions as they are continue to point out, as does Howard Florance in his *Review of Reviews* article "But Wages Have Come Down," that all along the line workers' incomes have been reduced, since "it is obviously not the hourly wage but rather the weekly or monthly total that counts."

Mr. Florance, in summarizing the situation, shows that the wages of unskilled labor began to decline as far back as a year ago, and have not yet stopped; that the farm hand's pay has dropped materially; that office salaries have been cut far and wide and deep. He then suggests that for the sake of accuracy and honesty a single word be added to the wage maintenance slogan, making it read. "The wages of *organized* labor must not and shall not be decreased."

The reason for the insistence of union heads on holding the hourly or daily wage rate that prevailed in the so-called prosperity of 1928 and 1929 is understandable. They speak of these high wages as the result of years of struggle by organized labor and feel that whatever may now be cut from them by labor's consent will be a long time in coming back and will be regained only by hard fought battles. Yet it is possible to exaggerate what organization has done for wages and thus to magnify the resistance the unions would encounter in the effort to recover the old scales when good times return. The wide acceptance of the formula that high wages freely spent create and sustain prosperity has done more for the employees' pay envelope in post-war years, we venture to say, than the combined militant strategy of all the union leaders whose voice has been so generally taken for the voice of American labor.

In all the shrinkages that have come in the past year in commodity prices, in return on invested capital, and in incomes of every description, it does not appear that this purchasing power emphasis has been dropped from our economic thinking. Economists, leaders in industry and leaders of organized labor are agreed that every effort should be made to increase buying power. But there is a sharp difference of opinion as to the efficacy of wage rate maintenance as a support to buying power.

What cannot be disputed is that in one way or another the majority of wage earners have recognized the necessity for adjustments to meet an un-

paralleled situation. Neither they nor their employers have given any sanction to a reduction in the scale of living. It is to be expected that both sides will put new emphasis on higher wages as a support for large scale consumption when commodity prices again show an upward trend.

▲▲▲

▲▲▲ CORRESPONDENCE ▲▲▲

Lower Wages, as They Were Raised, According to Living Costs

To the Editor: The stand being taken by ill-advised leaders of industry and workmen's organizations with reference to the maintenance of wages on a dollar and cents basis is uneconomic and untenable and if persisted in will only lead us further into the mire of business stagnation. If the contention that the maintenance of high wages is necessary for the insurance of a high standard of living on the part of the wage earner and a return of prosperity, why have we not seen some evidences that such is a fact instead of seeing conditions gradually growing worse instead of better and why should the depression have started when wages were the highest in history?

A demand for a return of conditions where opportunities would be afforded for excessive profits in stock market transactions, dividends, etc., would be as equally consistent as a demand for the maintenance of wages, perhaps more so, as high wages were undoubtedly brought about as a result of these profits. These large profits were, to the greatest extent, converted into larger and better homes, larger and better plants and buildings, automobiles, etc., or in financing these. And ultimately these same profits found their way into the pockets of workmen in the building trades or employees in industry. This encouraged high wages which only the rich could pay, in reality rich man's wages. The elimination of these profits has directly resulted in widespread unemployment in the building trades as well as industry.

The potential market for homes and products of industry is as great today, if not greater, than ever before among the low wage or salaried earners and the producer of agricultural products. Adjust the prices of the products of industry (which cannot be done if wages based on dollars and cents are maintained), to compare with their purchasing power and business will again recover. Profits in industry would soon be restored as profits are rarely possible except on the basis of volume.

At present what chance has a low wage or salaried employee to pay for a home, an automobile, radio, etc., out of his possible meager savings or the agricultural producer from the sale of his products?

The employee who has held a job or position through the present depression without having had his compensation decreased in dollars and cents has found his purchasing power greatly increased without increased effort on his part. Who pays for this virtual increase in wages or salary? Someone has to pay, possibly by the loss of a job or loss of chances to secure employment if now unemployed. Is not the hold of the regularly employed on their jobs daily becoming more precarious as their purchasing power increases and is this situation, if continued, conducive to a business recovery?

Wages and salaries previous to the beginning of the depression were advanced largely in accordance with the increasing cost of living. Notwithstanding the present

decreasing cost of living, our leaders of industry are now endeavoring to accomplish what in reality amounts to an evasion of the law of supply and demand, such as our Government and many other governments have unsuccessfully tried to do in the past. The only solution is to reverse the operation and any panacea or remedy which does not provide for this smacks of an effort to pull ourselves out of a hole by our boot straps.

R. B. SUTTON,
Vice-president, Hills-Sutton Co.
El Paso, Tex.

▲▲▲

How Wage Reductions Will Help

To the Editor: Mr. Van Deventer's article "Let's Go Back to Arithmetic," in June 11 IRON AGE, was read with interest, and I agree that declining prices and increasing wages build up prosperity. I must also agree that price decline and wage increase can only be maintained by modernization and mechanization. However, it seems improbable that from our present position we can modernize and mechanize our plant and maintain our present wage rates. The following cost statements do not require the help of an accountant or a mathematician to understand.

	1932	
	Factory A	Factory B
Labor cost (50c. per hr.—2 hr. per unit) (Wages cut to 40c. per hr.—2 hr. per unit)		
Material cost	.25	.25
All overhead	.40	.40
Total cost	\$1.65	\$1.45
Selling price	1.85	1.85
Profit	\$0.20	\$0.40
Six per cent dividend	.20	.20
Surplus used for modernization, etc.	\$0.00	\$0.20

	1933	
	Factory A	Factory B
Labor cost (50c. per hr.—2 hr. per unit) (Wages raised to 45c. per hr.—modernization and mechanization reduce time per unit to 1.67 hr. per unit)		
Material cost	.25	.25
All overhead	.40	.40
Total cost	\$1.65	\$1.40
Selling price	1.85	1.80
Profit	\$0.20	\$0.40
Six per cent dividend	.20	.20
Surplus used for modernization, etc.	\$0.00	\$0.20

	1934	
	Factory A	Factory B
Labor cost (50c. per hr.—2 hr. per unit) (Wages raised to 50c. per hr.—modernization, etc., reduce time per unit to 1.40 hr. per unit)		
Material cost	.25	.25
All overhead	.40	.40
Total cost	\$1.65	\$1.35
Selling price	1.85	1.75
Profit	\$0.20	\$0.40
Six per cent dividend	.20	.20
Surplus for modernization, etc.	\$0.00	\$0.20

By reducing wage rates only in proportion to the present reduction in commodity prices, we have maintained our 1929 real wage. We have not decreased our purchasing power by our wage reduction, for the saving made in labor cost is spent in other industries. Arithmetic indicates that a wage rate reduction now will start a long period of price decline and a real wage increase, and materially benefit labor, industry and the consumer.

J. R. IRWIN,
Superintendent Time Study,
Colorado Fuel & Iron Co.
Pueblo, Colo.

▲▲▲

"Why Aluminum Fence" is the title of a booklet outlining the development of aluminum for woven-wire fence and printed for distribution by the Page Steel & Wire Co., Bridgeport, Conn.

Continuing the Comment On "Let's Go Back to Arithmetic"

SYMPOSIUMS of reader comment on the article "Let's Go Back to Arithmetic," appeared in the issues of July 2 and July 16, following the original publication on June 11. The comment from executives and financiers is continued in this issue of THE IRON AGE.



WE agree with you that wage reduction should not be considered "when it means the lowering of living standards," but we cannot agree with the current propaganda that labor should not absorb its proper share of the adjustment through which we are now passing. It is impracticable to set aside any one group, or commodity, and guarantee that everything else will be adjusted, but that this particular favorite will be protected. We must all sink or swim together.

Fundamentally, we agree with your principles and exhortation to "discard the higher mathematics and put simple arithmetic to work to build industry's new skyline."

G. R. HANKS,
President,
Taylor-Wharton Iron & Steel Co.

to death," I also find a great many men engaged in the production of goods, who very quickly throw up their hands if any suggestion is made to them along the lines of your article, which may be the reason that they are the ones who need the suggestion. Those who already follow the policy outlined by you are mostly in such a cash position that they don't require any help from the bank.

After all is said and done, it seems to me that management is the prime factor in both manufacturing and banking at all times. So far as our institution is concerned, we have tried at least to carry on a constructive policy all during the depression period.

H. A. SMITH,
President,
Trenton Trust Co.



AS far as the banker's part in the question is concerned, it should be, at all times, his policy to help to bring about improvements in mechanization that will enable his borrowers to produce their goods on a more economical and profitable basis, particularly should this policy be followed during the present conditions in business. While I have found some bankers who are "scared



During the past five years a balanced budget of the cost of all the things necessary for living has been reduced 30 per cent and when it is

suggested that a partial absorption of this reduction might be made by reducing wages, immediately at such a suggestion a certain line of economists, and, of course, all the highly protected unions, are shocked beyond expression. No! There must be no reduction of wages. All of the lessened cost of living must add to the comfort of the highly paid wage earner, the result being that we are unable to compete with foreign countries so as to enable us to ship our goods abroad and the highly waged man has to take his loss in getting two or three days work a week rather than full time at a somewhat reduced rate of pay.

I am one, and I think the number is growing, of people who believe that an adjustment of wages must come before times improve.

H. N. WADE,

President,
United States Wind Engine &
Pump Co.

▲ ▲ ▲

I THINK your article in THE IRON AGE of June 11 attacks the causes and remedies for depression in a very elemental and sensible manner and the history of the years past has proved conclusively modern mechanization has not produced unemployment but exactly the opposite, as you say.

Also don't forget our engineers will always be at work producing novelties like radio, providing new jobs for our men laid off by machines.

Obsolete equipment probably was good enough for the selling prices of 1928 and 1929, but is it good enough for the selling prices of 1931 and possibly the next few years? I think not.

Possibly you might bring about the desired result sooner were you to add to your remedy a reduction of wages based on the present reduction in living costs. I do not believe that high wages make pros-



perity. I prefer to believe that prosperity makes high wages.

Labor is a very large element in the cost of production and a moderate reduction coupled with improved and up to date equipment would bring about a reduction in retail prices resulting in an increased demand and immediately more men would be put to work. Isn't it better to have only 10 per cent unemployment at a wage proportionate to its purchasing power than to have 30 per cent unemployment at high wages. The lower wage would be spread around among greater numbers.

I do not suggest any more of a reduction in wages and salaries than will give to people what they had in 1929.

There is plenty of money but will bankers loan it until they see the clouds clearing? It is a pretty good rule when driving your car to limit your speed so that you can stop it within the line of your vision. If I were a banker, I would be inclined to lend money the same way. After all, they are the custodians of the public's money and we can't altogether blame them for the fact that it is always hardest to get money when you need it worst. At

present we are on a road full of turns and grades and the vision is possibly limited and the banker's caution is perhaps justified.

What will most directly and quickly enlist the backing of the banker?

Producing at a profit on today's costs. Of course, the thing we want to do is to increase consumption and I am in favor of doing it the promptest way without being unfair or oppressive to any element of the people.

H. L. DONAHOWER,
President,
Standard Conveyor Co.

▲ ▲ ▲

Open-Hearth Furnace Control

(Concluded from page 245)

speaker said that it would take another year before we are "out of the woods" on the solution of a number of perplexing matters which now are interfering with complete success.

Historic conditions of the iron and steel industry were discussed by Theodore F. Foss, Wheeling Steel Corp., in connection with the matter of fuel engineering. The outside engineer, whether a consulting engineer or an engineer of an equipment company, is naturally a better salesman than the inside man. That is his job. Hence he gets a hearing from the management, where the fuel engineer of the plant may be unable to pry anything loose.

Automatic control, according to Mr. Foss, is not automatic and does not control. It is an alarm clock. If we concentrate on automatic control as such, we will lose sight of many other important points affecting the efficiency of the open-hearth furnace, and that efficiency is exceedingly low.

One thing which the speaker pointed out as distinguishing the American practice from European is the matter of water cooling around the ports. This is done hardly at all in Europe. Consequently a considerable amount of heat is conserved through not being carried away in the cooling water.

Before automatic control can be a thorough success, according to one engineer present, it will be necessary to insulate the regenerator chambers and to box them up, to avoid infiltration of air. This point of view found a ready backing in other quarters. As one man put it, every furnace on being rebuilt is dif-

ferent from its first lines. This is as it should be, because there is always an effort to improve results.

However, there must be intelligent study of the operation of the unit during the run between rebuilds, to ascertain what direction to move in making improvements, and how to go about it. This speaker believes that, within the next ten years, all open-hearth furnaces will be fitted with equipment for automatic control, and that the industry will then be looking for new worlds to conquer. He expressed the belief that then the control of a combination of fuels and the control of the flue gas conditions will be combined, in getting best results.

Insulation against air infiltration is far more important than insulation against loss of heat, in the opinion of William P. Chandler, Jr., Blaw-Knox Co., Pittsburgh. He referred to several devices of control for furnaces, including draft control, control of input of air and control of reversal of the furnace based on temperatures or temperature differences. Many plants have used one or more of these control arrangements, with varying results. The variances are laid largely to the fact that numerous outside factors sometimes are not allowed for.

In closing the discussion, Mr. Conway stated that installation of control equipment naturally leads to putting in other improvements to assist in the furnace operation. Use of control of combustion eliminates some of the variables in furnace operation, and thereby shows up the need for the further improvements. In any case, ability to control through the use of these devices is a good excuse for buying recording instruments, which will then tell week by week what the furnace is doing.

SAVINGS PER GROSS TON OF PRODUCTION AND RETURN ON INVESTMENT, ACCOUNT INSTALLATION OF OPEN-HEARTH FURNACE FUEL CONTROL

Furnace	No. 15	No. 19	No. 24
Gallons per gross ton before installation.....	46.2	47.0	47.0
After installation.....	38.8	40.5	42.4
Saving.....	.74	.65	.46
Value of saving per ton.....	\$0.234	\$0.206	\$0.146
Rebuilding cost before installation.....	.735	.739	.674
After installation.....	.535*	.539	.423
Saving.....	.200	.200	.251
Total saving per gross ton.....	\$0.34	\$0.434	\$0.397
Yearly production, gross tons.....	37,000	47,000	47,000
Value of yearly saving.....	\$16,058	\$19,082	\$18,659
Cost of equipment**.....	11,500	13,500	13,500
Yearly per cent of return.....	140	141	138

*Run not completed, cost estimated.

**Includes cost of installation, meters, recording instruments, etc.

MARKETS



Less Than Seasonal Slow-Down Lends Buoyancy to Sentiment

SO little is July falling off from June in respect to shipments that hopefulness of a decided turn for the better by September is spreading through the producing end of the steel industry. The operating rate for the whole country has dropped 2 points in the week, or to 30 per cent of ingot capacity, but the belief is now very general that present levels of output will continue through August without material change.

Reduced requirements of the automobile builders, the completion of rail contracts and the falling off in large gas and oil line projects account largely for the curtailment. Two blast furnaces are scheduled to go out at Ensley this week and one steel company stack may be banked in the Chicago district. The automobile industry will reach the low of the year in August, with a production expected not to exceed 173,000 cars.

Construction enterprises are sustaining factors, such as a fairly steady movement of bridge and building work and, in the case of reinforcing steel, of continuing road work and public improvements. Tin plate consumption is also a strong supporting influence, although tin mill output has fallen rather sharply to a 60 per cent rate after weeks of approximately a 65 per cent gait.

THE movement to stabilize prices gained by the wide adoption last week of a reduction of \$1 a ton for bars, plates and shapes. In the case of bars particularly some revision downward on contracts was required, but the tonnage so affected was probably not very great and following so shortly the new classification and prices for sheets that seem to have been accepted almost without deviation, the price action respecting the heavy tonnage products has had the effect of measurably improving sentiment.

The reduction applies to Eastern basing points but no changes have been made at Chicago, where now the usual spread of \$2 a ton above Pittsburgh again obtains, against the \$1 difference that has ruled for some months. Price irregularities reported from that center may bring definiteness and clarification one way or the other in the coming week.

Current buying is not calculated by its volume to put the price structure to a severe test, yet in the instance of sheets, large consumers seem willing to make forward commitments on the new sheet basis.

INGOT Output Not Above 30 Per Cent of Capacity—Prog- ress in Price Stabilization— Added Strength to Old Material

And as regards the new higher price of \$1.90 a keg for wire nails to jobbers, some few contracts have been closed that were difficult to make when \$1.80 was the prevailing price.

The 1.75c. base for Detroit delivery of steel bars seems established. It is also a stabilizing item in that the varied possibilities of shipping, by water, by rail, by rail and water, and by motor truck, offered a convenient shield for price concessions. How the prices will work out for other Michigan consumer points and whether or not similar basings will be made for other forms of steel have not been developed. Consumers in general will profit by the change.

PRIMARY materials are featured by further evidences of strength in scrap prices. At Pittsburgh heavy melting steel has advanced 25c. a ton for the third consecutive week. The same grade is stiffening in the Youngstown district, while at Pittsburgh blast furnace grades rose \$1 and at Cleveland 50c. a ton.

Pig iron melt in New England has taken the first upturn in many months and sales have been in better volume at both Boston and New York. Included in the week's business were a 5000-ton and a 2400-ton lot. Pig iron shipments are improving in the Chicago district following the resumption of melt by foundries which had shut down early in the month. In the Central West, however, where the automotive industry is dominant, considerably less pig iron is moving than in June.

The last merchant stack to remain in operation in eastern Pennsylvania has been blown out for an indefinite period.

NON-FERROUS metals, which are more sensitive to international conditions than iron and steel, are comparatively buoyant. Large week-end export sales of copper caused the domestic price of that metal to rebound to 8c., Connecticut Valley. Tin has been irregular, but zinc and lead have held firmly at unchanged prices for the past week.

THE IRON AGE composite price for steel melting scrap has made the second advance since its 30-year low (\$9.08) was reached late in June. It is now \$9.25 a gross ton. The pig iron composite dropped 2c. to \$15.54, a new low since late 1915, and the finished steel composite has receded to 2.116c. a lb. from the 2.137c. level held for three weeks.

PITTSBURGH

Output Expected to Hold Through August
—Progress Made in Price Stabilization

PITTSBURGH, July 21.—Despite the failure of finished steel specifications to show any upward trend, sentiment in the market continues to be greatly improved over June. The month to date has shown less than a seasonal decline from June from a production standpoint, and there are indications that present levels of output will not be changed materially during August. It is difficult to say whether better sentiment has continued because demand has failed to drop more than it has or because of expected improvement during September. The latter cause must be given more weight as there is still a possibility of further curtailment in production during the next few weeks.

While miscellaneous demand for steel products is likely to hold at current levels, declines in certain lines are not unlikely. Tin plate production has fallen rather sharply this week to less than 60 per cent of capacity. Sheet mill schedules are also falling off following two or three weeks of higher output occasioned by price advances. Production of bars and strip steel seems to be fairly well adjusted to the lower rate of activity prompted by the declining requirements of the automobile industry and related lines. Pipe output is spotty, being largely dictated by large individual line pipe orders which are not evenly distributed among producers. Current releases on reinforcing steel and structural shapes are fairly well maintained, and slight improvement in inquiries for the latter may afford some new business in the near future.

The most important developments of the last week have been along the line of price and have aimed at stabilization. The movement to establish bars, plates and shapes at 1.60c., Pittsburgh, although representing a decline in the recent official quotation, will not involve the writing down of contracts on much significant tonnage. This is particularly true in the case of plates and shapes and reinforcing bars, on which the establishment of a minimum price of 1.60c. would represent an advance of \$1 to \$2 a ton on large tonnage business. Pittsburgh mills are willing to recognize a Detroit base on bars at \$3 a ton over the Pittsburgh figure. This move at present does not seem likely to spread to other products.

The recently adopted sheet schedules are holding remarkably well, with scarcely any price irregularity reported. While not much significant buying has appeared, larger consumers seem willing to make future commitments on the new basis and mills

Production has shown less than the seasonal decline from June.

* * *

Consumers of sheets seem uniformly willing to make future commitments on the new basis.

* * *

New quotations for the heavy tonnage products will not involve writing down of contracts on any significant volume.

* * *

Tin plate operations fell rather sharply to less than 60 per cent of capacity.

* * *

Old material prices are higher on both the steel-making and the blast-furnace grades.

* * *

seem determined to accept nothing less. Hot-rolled strip is well maintained at the \$1 a ton advance over second quarter business, and the market on cold-rolled strip is well held. Higher prices on merchant wire products have been given little test, and bolt and nut quotations are noticeably weak.

The raw material market is again featured by strengthening in scrap quotations, and heavy melting steel has advanced 25c. a ton for the third consecutive week. Other open-hearth grades are correspondingly stronger, and blast furnace scrap has advanced sharply. The coal market is somewhat weaker as production catches up to demand following some curtailment during the coal strike.

SEMI-FINISHED STEEL

No inquiry is before the trade, and buying is confined almost entirely to occasional renewal of contracts. Prevailing prices on billets, slabs and sheet bars range from \$29 to \$30, Pittsburgh. Forging billets are maintained at \$35. Releases on wire rods are light, and the price is subject to no irregularity at \$35, Pittsburgh or Cleveland.

PIG IRON

The rate of shipments does not differ materially from June, although some producers report a slight falling off. Smaller foundries in the district are using little or no iron and most of the consumption is accounted for by the makers of heavy machinery and equipment. Roll makers are

not busy and operations of the larger steel foundries are very light. No new buying is reported and the market is still quotable at the prices following.

Prices per gross ton, f.o.b. Valley furnace:
Basic \$15.50 to \$16.00
Bessemer 17.00
Gray forge 16.50
No. 2 foundry 17.00
No. 3 foundry 16.50
Malleable 17.00
Low phos., copper free 26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:
Basic \$16.00 to \$16.50
No. 2 foundry 17.50
No. 3 foundry 17.00
Malleable 17.50
Bessemer 17.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

RAILS AND TRACK ACCESSORIES

Operations are at the lowest point of the year to date, although makers of track supplies are still getting occasional releases. The Norfolk & Western has closed against its recent inquiry for track accessories, and the business was distributed among several makers. Prices on track accessories are holding and light rails are unchanged at \$34, Pittsburgh. Concessions of \$2 a ton are made when rail steel competition is encountered.

BOLTS, NUTS AND RIVETS

With business at a very low ebb and operations not averaging better than 25 per cent of capacity, the market on bolts and nuts is subject to considerable price irregularity. Additional concessions from the current discounts of 73 and 10 per cent off list on bolts and nuts are not uncommon. Small rivets, however, are well maintained, and the price of large rivets is holding at \$2.75 a 100 lb.

BARS, PLATES AND SHAPES

All the large makers of heavy hot-rolled steel products have joined in the movement to stabilize prices at 1.60c., Pittsburgh, which represents a decline of \$1 a ton from the recent official price. While the establishment of this figure as a minimum has entailed the writing down of some small contracts, it will represent a price advance to some large buyers who had heretofore been able to secure prices as low as 1.55c. and even 1.50c. on plates and shapes. The same is true of reinforcing bars, on which competition for sizable projects has been developing price concessions for two or three months. On ordinary merchant bars the 1.60c. price had represented the minimum on the majority of contracts, and the new price level may be

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	July 21, 1931	July 14, 1931	June 23, 1931	July 22, 1930
No. 2 fdy., Philadelphia.....	\$17.01	\$17.01	\$17.26	\$19.76
No. 2, Valley furnace.....	17.00	17.00	17.00	18.00
No. 2 Southern, Cin'ti.....	14.69	14.69	14.69	16.19
No. 2, Birmingham.....	12.00	12.00	12.00	14.00
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	18.00
Basic, del'd eastern Pa.....	16.75	16.75	17.00	18.75
Basic, Valley furnace.....	15.50	15.50	15.50	18.00
Valley Bessemer, del'd P'gh.....	18.76	18.76	18.76	20.26
Malleable, Chicago*.....	17.50	17.50	17.50	18.00
Malleable, Valley.....	17.00	17.00	17.00	18.50
L. S. charcoal, Chicago.....	25.04	25.04	25.04	27.04
Ferromanganese, seab'd car-lots	85.00	85.00	85.00	94.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

*Ferromanganese quotations adjusted to carload unit, larger quantities at discounts.

Rails, Billets, etc., Per Gross Ton:	July 21, 1931	July 14, 1931	June 23, 1931	July 22, 1930
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	34.00	34.00	34.00	36.00
Rerolling billets, Pittsburgh.....	29.00	29.00	29.00	31.00
Sheet bars, Pittsburgh.....	29.00	29.00	29.00	31.00
Slabs, Pittsburgh.....	29.00	29.00	29.00	31.00
Forging billets, Pittsburgh.....	35.00	35.00	35.00	36.00
Wire rods, Pittsburgh.....	35.00	35.00	35.00	36.00
Cents	Cents	Cents	Cents	
Skelp, grvd. steel, P'gh, lb...	1.60	1.65	1.65	1.70

Finished Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.65	1.65	1.65
Bars, Chicago.....	1.70	1.70	1.70	1.75
Bars, Cleveland.....	1.65	1.65	1.65	1.75
Bars, New York.....	1.93	1.98	1.98	1.98
Tank plates, Pittsburgh.....	1.60	1.65	1.65	1.65
Tank plates, Chicago.....	1.70	1.70	1.70	1.75
Tank plates, New York.....	1.88	1.93	1.93	1.93
Structural shapes, Pittsburgh.....	1.60	1.65	1.65	1.65
Structural shapes, Chicago.....	1.70	1.70	1.70	1.75
Structural shapes, New York.....	1.85 1/2	1.90 1/2	1.90 1/2	1.90 1/2
Cold-finished bars, Pittsburgh.....	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh.....	1.55	1.55	1.55	1.65
Cold-rolled strips, Pittsburgh.....	2.15	2.15	2.15	2.45

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

somewhat easier to establish than on plates and shapes. Establishment of a Detroit base on bars at \$3 a ton over the Pittsburgh level, and of a Cleveland base on plates at \$2 over the local mill base may also help to stabilize the price structure. While it is too early to ascertain the effect of these price moves on the market, it is thought by well informed individuals in the trade that such readjustments are merely paving the way for advanced quotations in the fall.

Current activity is confined almost entirely to specifications against contracts on reinforcing bars and structural shapes. Structural inquiry is reported to be slightly more active, but most of the outstanding jobs involve small tonnages. Post office work in various sections of the country is a large item. Plates are very dull, although a Pittsburgh maker has taken about 3000 tons for the rebuilding of 450 freight cars for the Norfolk & Western Railroad. An oil company is inquiring for three barges which will take 350 tons. No other sizable barge inquiry is in immediate prospect.

COLD FINISHED STEEL BARS

Recognition of a lower price on hot-rolled bars has not affected the market on cold-finished material, and producers continue to quote 2.10c., Pittsburgh. It is also understood that no Detroit base will be set up for cold-finished bars. Business is very quiet, and production averages about 20 per cent of capacity.

WIRE PRODUCTS

Reaffirmation of a \$1.90 per keg price on nails, with correspondingly higher figures on other merchant wire products, has driven in a little business. Manufacturers' wire continues very dull, with most of the large automotive users curtailing their requirements. The price is holding fairly well at 2.20c., Pittsburgh.

TUBULAR GOODS

No new pipe line awards have been reported in the last few days, and one large producer in this district has curtailed production considerably as the result of completing its last large order. Active inquiry is lacking, al-

though several prospective projects are being talked of which might possibly be added to this year's tonnage. Demand for butt-weld pipe continues steady, although at a very low level. Lap-weld material is very dull, and oil country casing is less active than was the case last month. Mechanical tubing and boiler tubing are moving at about the same rate which characterized their June activity.

SHEETS

With most of the larger sheet makers in this and nearby districts concentrating their efforts on price stabilization, the tone of the market has improved very materially since the beginning of the month. Consumers of sheet steel are beginning to place contracts for the remainder of the quarter at the new schedules, and in some cases comparatively large users who still have some low-priced tonnage coming to them have been willing to sign up for shipment after Aug. 1 at the new quotations. Scarce any shading is reported and that mostly in the form of pre-dating contracts rather than by the quoting of

THE IRON AGE COMPOSITE PRICES

Finished Steel

July 21, 1931
One week ago
One month ago
One year ago

2.116c. a Lb.
2.137c.
2.102c.
2.171c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.

1931.....
1930.....
1929.....
1928.....
1927.....
1926.....
1925.....

2.142c., Jan. 13; 2.102c., June 2
2.362c., Jan. 7; 2.121c., Dec. 9
2.412c., April 2; 2.362c., Oct. 29
2.391c., Dec. 11; 2.314c., Jan. 3
2.453c., Jan. 4; 2.293c., Oct. 25
2.453c., Jan. 5; 2.403c., May 18
2.560c., Jan. 6; 2.396c., Aug. 18

HIGH LOW

Pig Iron

\$15.54 a Gross Ton
15.56
15.63
17.09

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap

\$9.25 a Gross Ton
9.17
9.08
13.08

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

HIGH LOW

\$15.90, Jan. 6; \$15.54, July 21
18.21, Jan. 7; 15.90, Dec. 16
18.71, May 14; 18.21, Dec. 17
18.59, Nov. 27; 17.04, July 24
19.71, Jan. 4; 17.54, Nov. 1
21.54, Jan. 5; 19.46, July 13
22.50, Jan. 13; 18.96, July 7

HIGH LOW

\$11.33, Jan. 6; \$9.08, June 23
15.00, Feb. 18; 11.25, Dec. 9
17.58, Jan. 29; 14.08, Dec. 3
16.50, Dec. 31; 13.08, July 2
15.25, Jan. 11; 13.08, Nov. 22
17.25, Jan. 5; 14.00, June 1
20.83, Jan. 13; 15.08, May 5

lower base prices. Although releases have tapered off slightly in the last week, and operations will be scaled down accordingly, the aggregate production rate for the industry is still above the June average and current output ranges from 35 to 40 per cent of capacity. Mills rolling ordinary hot-rolled annealed sheets are making the best showing, with full-finishing output at the bottom, thus reflecting the low rate of business from the automobile industry.

TIN PLATE

Production has dropped under 60 per cent this week after having been maintained for several weeks at approximately 65 per cent. This reflects lighter releases which have been generally reported since the beginning of the month. While some momentum may be expected as the later crops reach the canning stage, the seasonal high point in production has probably been passed.

STRIP STEEL

Strip mills are feeling the reduced requirements of the automobile industry more sharply than other steel finishing units. Hot-rolled strip production is not above 25 per cent of capacity and output of cold-rolled material is considerably less. Only one of the major motor car producers is specifying in anything comparable to normal volume, and many parts manufacturers are closed for summer inventory and vacation. Cash register and office equipment makers are also taking advantage of quiet business to close their plants for two or three weeks. Some of the smaller strip mills have been able to adopt every other week operating schedules, but others are still forced to run for a few turns in each seven-day period. Prices are the most encouraging factor in the market, with hot-rolled material generally maintained at 1.55c. and 1.65c., Pittsburgh, and cold-rolled at 2.15c., Pittsburgh or Cleveland.

COKE AND COAL

Production of coal has so far recovered from the effects of the mining strike that a surplus has again ap-

peared on the market, and prices are somewhat weaker. Coke is also in better supply than demand would justify, and price concessions have appeared on both foundry and furnace grades. The major producers continue to quote \$2.40, net ton, Connellsville, for furnace coke, and the foundry grade is available at \$3.25 to \$3.50. The premium grades of foundry coke are better maintained at \$4.50.

OLD MATERIAL

The scrap market has gained further strength in the last week with sales of No. 1 heavy melting steel into consumption at \$11 or better. Dealers are unable to buy against old contracts at less than \$10.50 and that figure is only being paid for odd lots. Hydraulic compressed sheets are also stronger, and here again sales are reported at only 25c. a ton under heavy melting steel. Blast furnace scrap has advanced sharply to around \$8 after having been nominally quoted at \$1 less for several weeks. Sales

into consumption at more than \$8 are reported. Machine shop turnings are also stronger and the other grades of scrap are expected to reflect higher prices on the open-hearth materials within another week. The rise in scrap prices has come more quickly than some dealers had anticipated, and the buying tendencies now apparent in the market promise even higher prices in the next month. It is considered significant that most of the buying reported this week has been by a single consumer, and the tonnage involved was very substantial considering the present market.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

No. 1 heavy melting steel..... \$10.50 to \$11.00
No. 2 heavy melting steel..... 9.50 to 10.00
Scrap rails..... 10.50 to 11.00
Compressed sheet steel..... 10.25 to 10.75
Bundled sheets, sides and ends..... 8.50 to 9.00
Cast iron carwheels..... 10.50 to 11.00
Sheet bar crops, ordinary..... 11.50 to 12.00
Heavy breakable cast..... 8.00 to 8.50
No. 2 railroad wrought..... 10.50 to 11.00
Hvy. steel axle turnings..... 9.00 to 9.50
Machine shop turnings..... 7.00 to 7.50

Acid Open-Hearth Grades:

Railr. knuckles and couplers..... 12.75 to 13.25
Railr. coil and leaf springs..... 12.75 to 13.25
Rolled steel wheels..... 12.75 to 13.25
Low phos. billet and bloom ends..... 14.50 to 15.00
Low phos. mill plates..... 12.00 to 12.50
Low phos. light grades..... 12.00 to 12.50
Low phos. sheet bar crops..... 13.00 to 13.50
Heavy steel axle turnings..... 9.00 to 9.50

Electric Furnace Grades:

Low phos. punchings..... 13.50 to 14.00
Heavy steel axle turnings..... 9.00 to 9.50

Blast Furnace Grades:

Short shoveling steel turnings..... 7.75 to 8.25
Short mixed borings and turnings..... 7.75 to 8.25
Cast iron borings..... 7.75 to 8.25

Rolling Mill Grades:

Steel car axles..... 16.50 to 17.50

Cupola Grades:

No. 1 cast..... 10.00 to 11.00
Rails 3 ft. and under..... 12.50 to 13.00



Spang, Chalfant & Co., Inc., Pittsburgh, manufacturers of welded and seamless pipe, has opened a sales office in the Russ Building, San Francisco, in charge of J. V. Greer, formerly in charge of the Birmingham sales office.

*On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lb.

CHICAGO

CHICAGO, July 21.—Any gain registered in steel orders since the first week of the month has been more than offset by curtailment in plate shipments to pipe manufacturers. Ingot production by one producer has been lowered at least 5 points, and the average for the district as a whole is not above 30 per cent of capacity. There are now in blast ten steel mill stacks, but iron accumulations are usually heavy and it will not come as a surprise to the trade if one blast furnace is banked in the next few days.

Both new business and specifications are slowly growing as more industrial plants resume operations after the July shutdowns. This growth in demand is small and gives proof of only one thing and that is the extreme caution with which buyers are operating. Pig iron producers not having had the support of a heavy consumer, such as was the case of pipe manufacturers in the steel market, report a slow but steady growth in releases. This again is a reflection of the ending of many July shutdowns. The difference is that steel production is tapering, while pig iron shipments are in larger volume now than during the early part of the month.

An order for tank plates and new plate inquiries are encouraging, and the interest being shown seems to carry beyond the flash point that is so characteristic in a market of the kind of today's. Structural awards and fresh inquiries have reversed their courses and once again are taking rather an important place in the local market. There is talk throughout the trade that estimates on the Chicago Post Office will exceed the appropriation and there is much speculation as to when construction will actually begin.

PIG IRON

A fair number of foundries have resumed operations at a low scale after having been closed down for several weeks. This is reflected in shipments of Northern foundry iron to the point where it is now evident that deliveries in the last half of the month will exceed shipments in the first two weeks. The change that is taking place is slow and the movement is small and cannot at this time be taken as a definite turn for the better. New buying is about on a par with that of recent weeks. Some purchases are for the remainder of the quarter while others are of small size and for immediate delivery. In general, melters remain cautious and hold stocks on hand to the minimum. Reports are current that Southern

Drop in Shipment of Plates for Pipe Accounts for Cut in Operations

▲ ▲ ▲

Steel output now not over 30 per cent of capacity.

* * *

New orders and specifications on the old show some expansion.

* * *

Demand for tank plates and structural steel is of encouraging proportions.

* * *

A fair number of foundries have resumed operations and the growth in pig iron shipments is distinctly favorable.

▼ ▼ ▼

iron can be had at \$10.50 a ton, Birmingham, for delivery into this district. The generally accepted price is \$11. The charcoal iron market is dull and silvery is moving in small volume.

Prices per gross ton at Chicago:		
N'th'n No. 2 fdy., sil. 1.75 to 2.25	17.50	
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00	
Malleable, not over 2.25 sil.	17.50	
High phosphorus	17.50	
Lake Super. charcoal, sil. 1.50	\$25.04 to 27.04	
S'th'n No. 2 fdy.	17.01	
Low phosph., sil. 1 to 2, copper free	23.50 to 29.20	
Silvery, sil. 8 per cent.	24.79 to 26.79	
Bess. ferrosilicon, 14-15 per cent	35.79	

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including an average switching charge of 61c. per gross ton.

CAST IRON PIPE

The bulk of transactions are of unusually small size and inquiries are not promising. Specifications issued by the public utilities are below seasonal expectations and it is very seldom that a railroad finds needs for cast iron pipe. R. D. Wood & Co. have taken 180 tons of 4 to 10-in. pipe for delivery to Fond du Lac, Wis., and James B. Clow & Sons will furnish about 250 tons of miscellaneous pipe for several sewage treating plants being constructed along the Lake Michigan shore to the north of Chicago. There is still some doubt as to the exact tonnage that will be used at the Calumet sewage treating plant south of Chicago. Estimates range from 400 to 1000 tons. Fox Point, Wis., is reported to have rejected bids on 1100 tons, but the information available here is that this village is now receiving the last shipments against an 1100-ton contract with the Alabama Pipe Co., and will open bids

July 31 on 1100 tons of 6 to 12-in. Class C pipe and also 25 tons of specials and 96 hydrants.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42 to \$44; 4-in., \$45 to \$47; Class A and gas pipe, \$3 extra.

WAREHOUSE BUSINESS

Using as a gage the number of orders received it is quite clear that there is no improvement in distribution. The fact of the matter is that the trend is somewhat mixed, though when considering tonnage ordered there has been very little variation in recent weeks. The number of orders received from country districts is larger, whereas orders from city users are lower in number. Prices are on a fairly stable footing.

COLD-ROLLED STRIP

Demand remains light and output stands close to 19 per cent of capacity for the country as a whole. Order books are small and spot business is variable and in light aggregate volume.

RAILS AND TRACK SUPPLIES

Releases of standard section rails are scarcer than heretofore and production cannot be measured above 20 per cent of capacity for the district. Releases of track supplies are in somewhat better comparative volume than for rails, but nevertheless this market is well below what is normally expected at this time of year.

REINFORCING BARS

Public work continues to swell the pending list and reinforcing bar dealers estimate that the tonnage before the trade is now the best in many months. Shipments against road contracts remain large, but this may be checked because many contracts recently awarded do not comply with the Prevailing Wage Act recently passed by the Illinois Legislature. This situation promises to tie up for six to ten weeks about \$10,000,000 worth of State road work. Shop operations are down several points to the low for the year, but projects now taking shape promise to speed output in the late summer. Prices remain irregular and weak.

SHEETS

A few small contracts for delivery during the remainder of the third quarter have been placed with local mills at the prices established July 1. There is also some spot buying at the new quotations. These conditions bring hopes to producers that prices now in effect will stand a real test whenever it makes itself felt. De-

mand is of a very miscellaneous character, but at the same time somewhat broader than earlier in the month. There are a few indications that some industrial plants that curtailed sharply near July 4 now have slightly heavier operating schedules. Sellers are trying to feel out the roofing trade, which should under normal conditions begin to take sheets for the fall trade. Hot mills continue to produce at 40 per cent of capacity.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.40c. to 2.50c.; No. 24 galv., 2.95c. to 3.05c.; No. 10 blue ann'd, 2.00c. to 2.10c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

WIRE PRODUCTS

Shipments of wire and wire products are moving very slowly and production at 30 per cent of capacity appears to be more than keeping pace with demand. Manufacturing remains on a scale that is only a trifle above the rate of the first week in July. Reinforcing mesh shipments are still in good volume, but the bulk of this is going into road work and only a fractional part to building construction, which normally takes a large quantity.

BARS

By far the largest movement of bars in any one direction in this district is for reinforced concrete work. Use by automobile manufacturers remains comparatively light and only small quantities are moving to car builders, agricultural implement makers and other heavy consumers. The 1.70c. a pound price for mild steel bars is not without variation even on small and mixed lots. Demand for iron bars as a commodity continues to narrow. Only recently a staunch user of iron bars has altered specifications so that steel bars are acceptable. Output of rail steel bars has leveled at 40 per cent of capacity, but buying is light and the outlook is uncertain. Shipments of fence posts rolled from old rails have dropped almost to the vanishing point, which is uncommon even for July.

FERROALLOYS

Specifications continue to fall off slowly. Consumption by steel-making units is lighter and steel foundries continue to operate at a rate which is easily the low of the year.

PLATES

The plate market has gone rather stale for the reason that its main support, the pipe business, is not holding up in this district. One plate mill in particular has dropped rather sharply with the completion of a pipe contract and it will contribute most of the loss this week in ingot production. An order was placed for 900 tons of plates for tanks for tank cars. An inquiry for storage tanks brings 1800 tons of plates into the market.

The Northern Pacific has finally inquired for 500 underframes and a like number of superstructure sets for 40-ton box cars to be built in the railroad's shops.

STRUCTURAL MATERIAL

Structural business is again more active with awards at 4500 tons and fresh inquiries at over 12,000 tons, not including 10,000 tons for highway work in Louisiana. Much Illinois State work may be delayed because of the "prevailing wage act" recently passed by the legislature. It has been ruled that contracts made before July 1, when the act became effective, come under the law, and there is fear among fabricators that contracts for which in some cases shops had been cleared will be canceled and readvertised. The law provides that on public construction wages shall be paid equal to the prevailing rate in the community in which the work is to be undertaken.

BOLTS, NUTS AND RIVETS

Specifications remain light and spot buying is all but absent. Releases by automobile manufacturers continue to taper and there is no word of encouragement from manufacturers of farm equipment.

COKE

Shipments have turned slightly heavier, but there is no chance that July will be lifted from the bottom position it holds in the first seven months of the year. Prices are steady at \$7.50 a ton, local ovens.

OLD MATERIAL

Interest has suddenly switched from heavy melting steel to cast iron borings for the reason that an accumulation of borings on a local dock has been sold to a Buffalo steel producer and the scrap will move by boat from Chicago to Lake Erie. The

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	2.75c.
Reinforcing bars, billet steel. 1.55c. to 2.00c.	
Rail steel reinforcement—	
For buildings..... 1.45c. to 1.65c.	
Highway slabs..... 1.50c.	
For bridges and culverts..... 1.65c.	
Cold-fin. steel bars and shafting—	
Rounds and hexagons..... 3.10c.	
Flats and squares..... 3.60c.	
Bands, $\frac{1}{8}$ in. (in Nos. 10 and 12 gauges)..... 2.95c.	
Hoops (No. 14 gauge and lighter)..... 3.50c.	
Hot-rolled annealed sheets (No. 24)..... 3.55c.	
Galv. sheets (No. 24)..... 4.10c.	
Hot-rolled sheets (No. 10)..... 3.20c.	
Spikes ($\frac{1}{8}$ in. and larger)..... 3.45c.	
Track bolts..... 4.30c.	
Rivets, structural..... 4.00c.	
Rivets, boiler..... 4.00c.	

Per Cent Off List

Machine bolts.....	60, 10 and 10
Carriage bolts.....	60, 10 and 10
Coach and lag screws.....	60, 10 and 10
Hot-pressed nuts, sq., tap, or blank,.....	60, 10 and 10
Hot-pressed nuts, hex., tap, or blank,.....	60, 10 and 10
No. 8 black ann'd wire, per 100 lb. 3.45	
Com. wire nails, base per keg..... 2.30	
Cement c't'd nails, base per keg..... 2.30	

price paid at the dock is reported to have been above prevailing quotations in the Chicago market. However, the effect of the water movement transaction is of little consequence from the price angle because local consumers of borings are not interested in purchases and are flatly turning down all offerings. With this tonnage moved from this market and production low, cast iron borings will gain a technically stronger position. Trends in general are mixed. Some prices are easier while others are higher. It is significant that inquiries have increased. On the other side of the picture are reduced acceptances of heavy melting steel by large consumers and a stagnant condition as far as malleable grades are concerned.

Prices del'd Chicago dist. consumers:

Per Gross Ton

Basic Open-Hearth Grades:		
Heavy melting steel.....	\$8.50 to	\$9.00
Shoveling steel	8.50 to	9.00
Frogs, switches and guards, cut apart, and misc. rails	8.50 to	9.00
Factory hyd. comp. sheets	7.00 to	7.50
Drop forge flashings.....	6.00 to	6.50
No. 1 busheling	6.75 to	7.25
Forg'd cast and r'l'd steel carwheels	9.00 to	10.00
Railroad tires, charg. box size	10.50 to	11.00
Railroad leaf springs cut apart	10.50 to	11.00
Axle turnings	7.00 to	7.50

Acid Open-Hearth Grades:		
Steel couplers and knuckles	9.75 to	10.25
Coil springs	11.50 to	12.00

Electric Furnace Grades:		
Axle turnings	7.50 to	8.00
Low phos. punchings.....	10.75 to	11.25
Low phos. plates, 12 in. and under	10.50 to	11.00

Blast Furnace Grades:		
Cast iron borings	3.75 to	4.00
Short shoveling turnings.....	3.75 to	4.25
Machine shop turnings.....	3.75 to	4.25

Rolling Mill Grades:		
Rerolling rails	10.50 to	11.00

Cupola Grades:		
Steel rails, less than 3 ft. ..	10.25 to	10.75
Steel rails, less than 2 ft. ..	11.00 to	11.50
Angle bars, steel	9.25 to	9.75
Cast iron carwheels.....	10.00 to	10.50

Malleable Grades:		
Railroad	8.50 to	9.00
Agricultural	8.50 to	8.75

Miscellaneous:		
*Relaying rails, 56 to 60 lb.	19.00 to	21.00
*Relaying rails, 65 lb. and heavier	22.00 to	27.00

Per Net Ton

Rolling Mill Grades:		
Iron angle and splice bars.	8.50 to	9.00
Iron arch bars and transoms	10.50 to	11.00

Iron car axles	17.50 to	18.50
Steel car axles	12.00 to	12.50
No. 1 railroad wrought....	7.00 to	7.50
No. 2 railroad wrought....	7.50 to	8.00
No. 1 busheling.....	6.00 to	6.50
No. 2 busheling.....	4.00 to	4.50
Locomotive tires, smooth.....	11.50 to	12.50
Pipes and flues	5.50 to	6.00

Cupola Grades:		
No. 1 machinery cast....	9.00 to	9.50
No. 1 railroad cast....	8.00 to	8.50
No. 1 agricultural cast....	7.00 to	7.50
Stove plate	6.25 to	6.75
Grate bars	5.50 to	6.00
Brake shoes	5.75 to	6.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.



A continuous pickler is to be installed in connection with the new continuous strip mill being built at the Riverside works of the Otis Steel Co. by the Aetna Standard Engineering Co., Youngstown, Ohio.

CLEVELAND

Steel Output Drops to 26 Per Cent—
1.60c. Now General on Bars, Plates, Shapes

CLEVELAND, July 21.—Demand for finished steel continues very light, orders being few in number and confined to small lots. Specifications from the motor car industry have further declined and, as a result, some of the sheet and strip mills are operating at a lower rate than a week ago. The open-hearth department of the Otis Steel Co., which was operating three furnaces, shut down this week. This leaves only nine out of 34 local furnaces operating, or 26 per cent of ingot capacity.

Many metal-working plants in this territory are still shut down for vacations and some will not resume until after Aug. 1. The building field shows little activity, and there is not much work in prospect. This recently has been confined largely to public work. Structural awards include 1475 tons for grade crossing elimination work in Toledo. For the Belvoir Boulevard extension, Cleveland, 700 tons of reinforcing bars has been placed for culvert work.

The price situation on heavy rolled steel products has been clarified considerably by the readjustment to 1.60c., Pittsburgh, on bars, plates and shapes.

IRON ORE

Consumption of Lake Superior ore during June amounted to 2,102,998 tons, a decrease of 571,760 tons from May. This compares with 4,288,471 tons smelted in June last year. Stocks at furnaces July 1 were 23,556,233 tons, and the amount at furnaces and Lake Erie docks on that date was 28,712,925 tons, as against 25,699,749 tons on July 1 last year. Central district furnaces in June consumed 1,137,315 tons, or 236,199 tons less than in May. Lake front furnaces used 940,760 tons, a decrease of 322,113 tons. All rail furnaces consumed 14,416 tons, a decrease of 8203 tons, and Eastern furnaces smelted 10,507 tons, a decrease of 5245 tons. There were 78 furnaces using Lake ore in blast June 30, a decrease of 12 for the month.

PIG IRON

Not much business was placed and little new inquiry came out during the week. A Dayton foundry that inquired for 1000 tons of foundry iron is understood to have placed a portion of this tonnage. Prospective buyers are slow in placing orders. However, a few lots of 500 to 1000 tons that have been pending are expected to be closed this week. Foundries making automobile castings are not buying pig iron, as they are waiting until they take some orders for castings. Some inquiry is now out for castings for automobile body dies. Operations by job-

bing foundries continue light. Pig iron shipments are not holding up to the June volume. Prices on foundry and malleable iron are well maintained at \$16 to \$17, Lake furnace, for Ohio and Indiana; \$17 to \$17.50 for Michigan, and \$17, Cleveland, for local delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25.....	\$17.00
S'th'n fdy., sil. 1.75 to 2.25.....	17.01
Malleable.....	17.50
Ohio silvery, 8 per cent.....	25.00
Stand. low phos., Valley.....	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

BARS, PLATES AND SHAPES

These products have generally settled down to 1.60c., Pittsburgh, following the announcement last week of a price readjustment to 1.60c. to 1.65c. Contracts have been revised to the lower figure, which is also being quoted for car-lot orders. The 1.65c. price now applies only to very small lots. The Cleveland base price on bars remains at 1.70c. for local delivery and 1.65c. for outside shipment. However, the latter price probably will be shaded for points where a Cleveland mill does not have sufficient freight rate advantage to offset the differential between the regular Pittsburgh and Cleveland bases. With this established differential, outside mills are now using a Pittsburgh base for some points for which they have been selling on a Cleveland base. While an effort is being made to add a switching charge on bars in Cleveland, this will have little effect during this quarter, as most consumers have contracted at 1.70c. delivered. Although billet steel reinforcing bars are generally quoted at 1.60c., Cleveland, this is being shaded to 1.55c. for specific jobs. The construction placed by some mills on the announced 1.65c., Cleveland, base on plates for railroad work is that this base will apply only to railroads entering Cleveland.

WIRE PRODUCTS

Some new business has been taken at the recent advance to \$1.90 per

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	2.95c.
Soft steel bars.....	2.75c.
Reinfor. steel bars.....	1.75c. to 1.95c.
Cold-fin. rounds and hex.....	3.10c.
Cold-fin. flats and sq......	3.60c.
Hoops and bands, No. 12 to $\frac{1}{2}$ in., inclusive.....	3.00c.
Hoops and bands, No. 13 and lighter.....	3.55c.
Cold-finished strip.....	* 5.55c.
Hot-rolled annealed sheets (No. 24).....	3.60c.
Galvanized sheets (No. 24).....	4.00c.
Hot-rolled sheets (No. 10).....	3.00c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.25
No. 9 galv. wire, per 100 lb.....	2.70
Com. wire nails, base per keg.....	2.10

*Net base, including boxing and cutting to length.

keg to jobbers. Few contracts were placed when \$1.80 was the prevailing price.

SHEETS

Mills are still shipping sheets against orders placed in June before the price advance, but these will be cleaned up next week, as July 31 was set as the deadline date for making deliveries at the old prices. Some buyers specified that shipments be made close to the end of the month. New business is limited to a few scattering orders for small lots and the new prices appear to be holding on all new business. Some new inquiry is coming out which evidently is for the purpose of sounding out the price situation. The slowing down in the motor car industry is being reflected in reduced activity by stamping plants. Demand for furniture sheets and enameling stock is slack.

STRIP STEEL

Orders for hot-rolled strip are scarce and confined to very small lots, as most consumers ordered enough material last month at the old prices to take care of their needs for several weeks. The little new business that is coming out is being taken at the advanced prices of 1.55c., Pittsburgh, for wide and 1.65c. for narrow.

OLD MATERIAL

A Cleveland mill made additional purchases of 5000 tons of blast furnace scrap during the week, paying \$7 to \$7.25 for borings and turnings and \$6.75 for No. 2 busheling. This buying has strengthened local prices on these grades about 50c. a ton. A sale of No. 2 compressed sheet scrap was made at \$8 to a Valley dealer. In the absence of a local demand machine shop turnings are weaker.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel.....	\$8.50 to	\$9.00
No. 2 heavy melting steel.....	8.00 to	8.50
Compressed sheet steel.....	7.50 to	8.00
Light b u n d l e d sheet stamping.....	6.50 to	7.00
Drop forge flashings.....	6.75 to	7.00
Machine-shop turnings.....	4.75 to	5.00
Short shoveling turnings.....	6.25 to	6.75
No. 1 railroad wrought.....	9.50 to	10.00
No. 2 railroad wrought.....	10.00 to	10.50
No. 1 busheling.....	6.75 to	7.00
Pipes and flues.....	5.50 to	6.00
Steel axle turnings.....	7.50 to	8.00

Acid Open-Hearth Grades:

Low phos., billet bloom and slab crops.....	14.00 to	14.50
--	----------	-------

Blast Furnace Grades:

Cast iron borings.....	6.50 to	6.75
Mixed borings and short turnings.....	6.50 to	6.75

No. 2 busheling.....

6.00 to	6.25
---------	------

Cupola Grades:

No. 1 cast.....	10.00 to	10.50
Railroad grate bars.....	6.00 to	6.50

Stove plate.....	6.00 to	6.50
Rails under 3 ft.....	15.00 to	15.50

Miscellaneous:

Rails for rolling.....	12.00 to	13.50
Railroad malleable.....	11.00 to	11.25

NEW YORK

Fair Amount of Pig Iron Buying—Bars, Plates and Shapes Drop \$1

NEW YORK, July 21.—Despite a lack of open demand for pig iron, a relatively fair amount of buying is evident in the local market. Sales for the past week aggregated about 6500 tons, compared with 5000 tons the week previous. A Connecticut melter purchased 2400 tons for barge delivery over the next three months, and A. P. Smith Mfg. Co., East Orange, N. J., bought 750 tons of foundry iron for last-half shipment. Prospective business does not exceed 2000 tons, but with furnace piles gaining proportions in at least one furnace district, further selling pressure is in prospect. Owing to the complicated situation arising from the storing of iron at several seaboard points, accurate basing of furnace schedules is precluded, but several sales have been made on delivered bases working back to \$14.50, Buffalo furnace.

A cargo of African manganeseiferous ore from Postmasburg is reported to have been delivered recently to the Port Colborne Furnace Co., Port Colborne, Ontario, presumably for the production of a limited quantity of spiegeleisen.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75
to 2.25 \$19.41 to \$19.91
*Buff. No. 2, del'd east.
N. J. 17.78 to 18.28
East. Pa. No. 2 fdy., sil.
1.75 to 2.25 17.39 to 17.89
East. Pa. No. 2X fdy., sil.
2.25 to 2.75 17.89 to 18.39

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

FINISHED STEEL

The betterment in market sentiment that followed the Hoover moratorium proposal has virtually spent itself as international negotiations have become more protracted. Some producers find specifications worse than in the summer of 1921, and about the only mills still making a fair showing are those having tin plate among their lines of products. Most sellers are resigned to a very dull summer, although clinging to the hope that a seasonal upturn will make its appearance late in August.

Prices on plates, shapes and bars are now generally \$1 a ton lower than recent open quotations. Bars are now held at 1.60c., Pittsburgh, plates at 1.70c., Coatesville, and shapes at 1.70c., Bethlehem. It is hoped that the markdown will stabilize a market that had been subject to widespread shading. Third quarter prices on sheets and strips are steady, although not subjected to severe tests.

Plate mills are interested in 570 tons for a 72-in. water line in the Bronx on which the New York Depart-

ment of Water Supply, Gas and Electricity will open bids on Aug. 4. The New York Central has placed 200 container cars with the American Car & Foundry Co. The cars, without the containers, will require about 2000 tons of steel, largely plates. The containers, 1200 in number, will be fabricated from sheets.

CAST IRON PIPE

Demand for pressure pipe is confined mainly to small lots for private interests. The only open inquiry reported is that of Troy Hills, N. J., for 2400 tons of 4 to 12-in. pipe. The Board of Water Supply, New York, is understood to be asking for quotations on a small quantity of large sizes for pipe line construction. No outstanding awards are reported.

Prices per net ton delivered New York: Water pipe, 6-in. and larger, \$32.90; 4-in. and 5-in., \$35.90; 3-in., \$42.90. Class A and gas pipe, \$3 extra.

REINFORCING BARS

Quotations are 1.60c. a lb., Pittsburgh, or 1.93c., New York, and, although mills have recently stated that they will not accept tonnage booked by distributors on a lower basis than 1.60c., Pittsburgh, small concessions still appear on sizable contracts. New projects requiring reinforcing bars are

Warehouse Prices, f.o.b. New York

Base per Lb.
Plates and strue, shapes, 2.70c. to 3.10c.
Soft steel bars, small shapes, 2.70c. to 3.10c.
Iron bars 3.24c.
Iron bars, Swed. charcoal, 7.00c. to 7.25c.
Cold-fin. shafting and screw stock—
Rounds and hexagons 3.40c.
Flats and squares 3.90c.
Cold-roll. scrap, soft and quarter
hard 4.95c.
Hoops 3.75c.
Bands 3.40c.
Hot-rolled sheets (No. 10) 3.00c. to 3.25c.
Hot-rolled ann'd sheets (No. 24*) 3.50c.
Galvanized sheets (No. 24*) 4.00c.
Long terne sheets (No. 24) 5.00c.
Standard tool steel 12.00c.
Wire, black annealed 4.50c.
Wire, galv. annealed 5.15c.
Tire steel, $\frac{1}{4}$ x $\frac{1}{4}$ in. and larger 3.40c.
Smooth finish, 1 to $2\frac{1}{2}$ x $\frac{1}{4}$ in.
and larger 3.75c.
Open-hearth spring steel, bases,
4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c.
higher per 100 lb.

Per Cent
Machine bolts, cut thread: Off List

$\frac{3}{4}$ x 6 in. and smaller 65 to 65 and 10

1 x 30 in. and smaller 65 to 65 and 10

Carriage bolts, cut thread:

$\frac{1}{2}$ x 6 in. and smaller 65 to 65 and 10

$\frac{3}{4}$ x 20 in. and smaller 65 to 65 and 10

Boiler Tubes: Per 100 Ft.

Lap welded, 2-in. \$19.00

Seamless steel, 2-in. 20.25

Charcoal iron, 2-in. 26.25

Charcoal iron, 4-in. 67.00

small and include 150 tons for a State hospital at Middletown, N. Y., and 100 tons for a State armory at Jersey City, N. J.

OLD MATERIAL

Following a brief period when holders of scrap were inclined to refrain from selling at current offers by brokers, most grades are again coming out freely. A broker with contracts for No. 1 and No. 2 heavy melting steel delivered to Buffalo steel mills is now loading five barges a week in New York harbor. With this company offering \$6.25 a ton, New York, brokers shipping to consumers at Claymont, Del., and Coatesville, Pa., have found it necessary in some cases to advance their offers for No. 1 steel to \$6 a ton, f.o.b. cars in New Jersey, which is equivalent to about \$5.15 a ton, New York. Heavy breakable cast is moving to Florence, N. J., and Harrisburg, Pa., at \$9.50 a ton, delivered, and stove plate for founders is slightly stronger with brokers offering \$7 a ton, delivered to a user at West Mahwah, N. J.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$5.00 to	\$6.25
Heavy melting steel (yard)	3.00 to	3.50
No. 1 hvy. breakable cast	6.00 to	6.50
Stove plate (steel works)	3.75 to	4.00
Locomotive grate bars	3.75 to	4.00
Machine shop turnings	2.00	
Short shoveling turnings	2.00	
Cast borings (blast fur. or steel works)	2.25	

Mixed borings and turn- ings	1.75 to	2.00
---------------------------------	---------	------

Steel car axles	13.00 to	13.50
-----------------	----------	-------

Iron car axles	16.50 to	17.00
----------------	----------	-------

Iron and steel pipe (1 in. dia. not under 2 ft. long)	6.00 to	6.25
--	---------	------

Forge fire	4.50	
------------	------	--

No. 1 railroad wrought	8.25	
------------------------	------	--

No. 1 yard wrought long	7.25	
-------------------------	------	--

Rails for rolling	6.00 to	6.50
-------------------	---------	------

Stove plate (foundry)	4.50 to	4.75
-----------------------	---------	------

Malleable cast (railroad)	7.50 to	8.00
---------------------------	---------	------

Cast borings (chemical)	8.00 to	8.50
-------------------------	---------	------

<i>Prices per gross ton, deliv'd local foun- dries:</i>		
---	--	--

No. 1 machry. cast	\$11.50 to	\$12.00
--------------------	------------	---------

No. 1 hvy. cast (columns, bldg. materials, etc.; cupola size)	9.50 to	10.00
---	---------	-------

No. 2 cast (radiators, cast boilers, etc.)	8.50 to	9.00
---	---------	------



John E. Broderick and Frank Bowers, of Youngstown, have formed the Sales-Service Co., located in the Terminal Building, representing the following companies: Falk Corp., Milwaukee; Fitzsimmons Co., Youngstown; Jessop Steel Co., Washington, Pa.; Keystone Machine & Engineering Co., Sharon, Pa.; Pittsburgh Gear & Machine Co., Pittsburgh; Titusville Forge Co., Titusville, Pa. Mr. Broderick was formerly in the sales department of the Aetna-Standard Engineering Co., Youngstown, and Mr. Bowers was in the mill supply business. Their new business takes over Youngstown Steel Sales, Inc.

PHILADELPHIA

Bar Contracts Have Been Revised— Last Merchant Furnace Out

PHILADELPHIA, July 21.—Influenced by the usual seasonal dullness in July and August, steel buying has receded further, and mill operations are decidedly irregular, averaging between 30 and 32 per cent of capacity. Steel bar contracts for this quarter have been revised downward from 1.65c., Pittsburgh, to the current level for bars of 1.60c., Pittsburgh. Plates are at 1.70c., Coatesville, Pa., and shapes at 1.70c., f.o.b. mill, for ordinary tonnages with concessions on desirable specifications. Decision of certain bar mills to pass up reinforcing bar business to distributors at less than 1.60c., Pittsburgh, has strengthened this market, but concessions on larger business have not been entirely eliminated. With most sheet consumers in this district covered for their requirements for the current month, the new sheet schedule is still untested, but sellers expect some buying to develop shortly for delivery of small needs in August.

The Atlantic Refining Co. has awarded 13 small oil storage tanks, requiring 400 tons of plates, for eastern Pennsylvania and Maryland, to the Chicago Bridge & Iron Works. The Pennsylvania Railroad is taking bids on bridges in Chicago, Pittsburgh and Lancaster, Pa., requiring about 600 tons of fabricated steel, and has awarded 530 tons of reinforcing bars for catenary bridge supports in the Wilmington to Washington electrifications.

PIG IRON

Although foundry iron buying is still limited to carload lots for prompt shipment at \$16.25 to \$16.50 a ton, eastern Pennsylvania furnace, consumers have almost no stocks on hand, and sellers believe that with even a slight improvement in business heavier pig iron requirements will result. The furnace at Birdsboro, Pa., has been blown out for an indefinite period. This was the only merchant stack remaining in operation in eastern Pennsylvania, and the only furnaces still in blast are those of the leading independent steel interest and the steel company furnace at Swedeland. Southern foundry iron is still quoted at \$11 a ton, Birmingham, or \$16.25, on dock, Philadelphia, and Indian iron is at \$18, base, on dock, Philadelphia. Sales of Indian pig iron are at present limited entirely to small lots for mixture purposes. Final shipment of basic iron from India on a contract for eastern Pennsylvania is expected early in August. The Virginia furnace which has been out of blast for some months still has a supply of most foundry grades in its stock piles, and may not find it necessary to blow in again until about the end of the year.

Prices per gross ton at Philadelphia:		
East. Pa. No. 2, 1.75 to 2.25 sil.	17.01 to 17.26	
East. Pa. No. 2X, 2.25 to 2.75 sil.	17.51 to 17.76	
East. Pa. No. 1X	18.01 to 18.26	
Basic (del'd east. Pa.)	16.75	
Malleable	19.00 to 20.00	
Stand. low phos. (f.o.b. east. Pa. furnace)	23.00 to 24.00	
Cop. b'rg low phos. (f.o.b. furnace)	22.00 to 23.00	
Va. No. 2 plain, 1.75 to 2.25 sil.	22.04	
Va. No. 2X, 2.25 to 2.75 sil.	22.54	

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

STEEL BARS

Contracts have been revised to 1.60c., Pittsburgh, or 1.89c., Philadelphia, which is the usual quotation on small lots of bars for current delivery. Billet steel reinforcing bars are at 1.60c., Pittsburgh, or 1.89c., Philadelphia, and distributors have adopted a slightly firmer attitude on prices following the recent decision of certain mills to refuse orders taken on a lower basis. Imported reinforcing bars are offering some competition for business in this district, importers being able to quote 1.30c. to 1.40c. per lb., on dock, Philadelphia, duty paid. Rail steel bars range from 1.20c. to 1.30c., Pittsburgh, or 1.49c. to 1.59c., Philadelphia.

SHAPES

Mills are quoting 1.70c., f.o.b. nearest mill to consumer, or 1.76c., Philadelphia, for small lots of shapes, and concessions of \$1 a ton to 1.65c., mill, or 1.71c., Philadelphia, are not uncommon on the more desirable specifications. Buying has been unusually light in the past week, and in certain instances mills have been rolling material for stock.

PLATES

Only a small tonnage of new business is in the market and the past week has been marked by decidedly irregular operation of mills. Small orders ranging in size up to a car-

Warehouse Prices, f.o.b. Philadelphia

Base per Lb.	
Plates, $\frac{1}{4}$ -in. and heavier	2.50c.
Structural shapes	2.50c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Reinforce. steel bars, sq., twisted and deform.	2.30c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.15c.
Steel bands, No. 12 to $\frac{1}{2}$ -in. incl.	2.90c.
Spring steel	5.00c.
Hot rolled, box annealed sheets (No. 24)	3.55c.
Galvanized sheets (No. 24)	4.00c.
Hot rolled, blue annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, $\frac{1}{4}$ -in.	5.20c.
Swedish iron bars	6.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

load, or slightly more, are usually quoted at 1.70c., Coatesville, Pa., or 1.80 $\frac{1}{2}$ c., Philadelphia, with concessions on the larger, more desirable contracts. Most mills are in need of small tonnages of certain sizes to complete rolling schedules, which cannot be delayed long for additional tonnage, because of the urgency of buyers for quick delivery.

SHEETS

No buying of consequence has developed to test the new schedule of prices, but sellers expect some small business for prompt shipment within the next week or ten days. Bids have been taken by a contractor on about 250 tons of galvanized sheets for ventilation ducts in the Philadelphia Savings Fund Building, but award of the business may be delayed until next month.

IMPORTS

In the week ended July 18, a total of 503 tons of manganese ore arrived at this port from Java, Dutch East Indies, and 30 tons of ferromanganese from the United Kingdom. A shipment of 22 tons of structural shapes arrived from Germany and 15 tons of charcoal iron bars from Sweden.

OLD MATERIAL

Except for transactions in carload lots of special grades, and a small tonnage of machine shop turnings and No. 2 steel moving to a consumer at Phoenixville, Pa., the market is quiet and prices generally unchanged. Brokers note a continued firmness on the part of holders of scrap, who are less willing to dispose of their holdings at present offering prices than a few weeks ago.

Prices per gross ton delivered consumers' yards, Philadelphia district:		
No. 1 heavy melting steel	\$8.00 to	8.50
No. 2 heavy melting steel	7.00	
No. 1 railroad wrought	10.00 to	10.50
Bundled sheets (for steel works)	6.50	
Hydraulic compressed, new	7.00 to	7.50
Hydraulic compressed, old	6.00 to	6.50
Machine shop turnings (for steel works)	5.00 to	6.00
Heavy axle turnings (or equiv.)	8.00 to	8.50
Cast borings (for steel works and roll. mill)	5.00 to	6.00
Heavy breakable cast (for steel works)	9.50 to	10.00
Railroad grate bars	8.00	
Stove plate (for steel works)	8.00	
No. 1 low phos., hvy. (0.04% and under)	12.00 to	13.00
Couplers and knuckles	11.00 to	11.50
Rolled steel wheels	10.00 to	11.00
No. 1 blast furnace	5.50	
Wrot. iron and soft steel pipe and tubes (new specific)	10.50 to	11.00
Shafting	16.50 to	17.00
Steel axles	16.00 to	16.50
No. 1 forge fire	8.00 to	8.50
Cast iron carwheels	12.00 to	12.50
No. 1 cast	11.00 to	11.50
Cast borings (for chem. plant)	12.00 to	12.50
Steel rails for rolling	10.50 to	11.00

BIRMINGHAM

BIRMINGHAM, July 21.—The pig iron market remains sluggish. Current business is made up of small scattered orders for prompt shipment. Occasionally there is some forward buying, but this is the exception. Quotations for district deliveries continue from \$12 to \$13. Shipments have not improved and are behind current production, as in June. Twelve furnaces are in blast. Two of the Ensley furnaces of the Tennessee company are scheduled to go out this week.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:
No. 2 fdy., 1.75 to 2.25 sil. \$12.00 to \$13.00
No. 1 fdy., 2.25 to 2.75 sil. 12.50 to 13.50
Basic 12.00 to 13.00

CAST IRON PIPE

Small tonnages continue the rule in the pipe market. Inquiries last week were not so numerous as expected. The pipe situation is still about the same as for weeks past. Plant operations remain around 50 per cent. National Cast Iron Pipe Co. and U. S. Pipe & Foundry Co. divided an award from San Francisco. American Cast Iron Pipe Co. received 1400 tons from St. Louis.

FINISHED STEEL

The Ensley rail mill of the Tennessee company will be closed down this week. Two blast furnaces will be blown out and the present schedule calls for the operation of four open-

Steel Making Operations Have Been Reduced

hearth furnaces at Ensley and four at Fairfield for a time at least. This schedule for Ensley is somewhat better than that of last July, when rail mill operations were likewise suspended. Last week the Tennessee company operated twelve open-hearth furnaces, Ensley ranging from 6 to 7 and Fairfield from 5 to 6. Gulf States Steel continues with two. This was just about the same rate as the preceding week. The steel market is without incident. New tonnage is sufficient to maintain operations and shipments at a steady level. Plate demand has improved slightly, while sheets are back at their usual July level. There has been a slight improvement in orders against structural specifications.

OLD MATERIAL

Inquiries were better last week and give indication of some prospective tonnage that may be placed at an early date. Buying continues light. Shipments on contracts have been going forward at a fair rate.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:
Heavy melting steel \$9.50 to \$10.00
Scrap steel rails 9.00
Short shoveling turnings 6.50
Cast iron borings (No market)
Stove plate 7.00
Steel axles 15.00 to 16.00
Iron axles 18.00
No. 1 railroad wrought 8.00
Rails for rolling 11.50 to 12.00
No. 1 cast 9.00
Tramcar wheels 10.00 to 10.25
Cast iron borings, chem. 13.50

for State work, such as highways, small bridges, roads, etc., although considerable school work is projected. The city of Hornell recently placed a contract for a new reservoir, requiring 100 tons of reinforcement. Warehouse business showed improvement, almost in the same proportion as June, and June was the best month so far. A reduction in the common wire nails base brings this quotation to \$2.45 a keg.

OLD MATERIAL

New sales are at a minimum. The leading consumer, which continues to offer \$7.50 and \$9 for No. 1 heavy melting steel and No. 2 heavy melting steel, is apparently not getting much at these figures. While dealers hesitate to predict a stiffening of prices on these standard commodities, most of them are declining to sell at these figures, and it looks as if the bottom had been reached. A recent sale of No. 2 heavy melting steel at \$7 noted last week was for a very small lot, and the deal included a purchase of some other material at a little higher than this concern usually pays. Some short orders are out for cast iron borings, but this commodity is scarce, for with the automobile plants in low production little is coming out.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:
No. 1 heavy melting steel \$9.00
No. 2 heavy melting scrap 7.50
Scrap rails \$10.00 to 10.50
Hydraul. comp. sheets 7.50
No. 2 hydraul. comp. sheets 7.00
Hand bundled sheets 7.00
Drop forge flashings 7.50
No. 1 busheling 7.50
Hvy. steel axle turnings 8.50 to 9.50
Machine shop turnings 4.50 to 5.00
No. 1 railroad wrought 7.50 to 8.00

Acid Open-Hearth Grades:
Knuckles and couplers 11.00 to 11.50
Coil and leaf springs 11.00 to 11.50
Rolled steel wheels 11.00 to 11.50
Low phos. billet and bloom ends 13.00 to 14.00

Electric Furnace Grades:
Short shov. steel turnings 6.00 to 6.50

Blast Furnace Grades:
Short mixed borings and turnings 6.00 to 6.50
Cast iron borings 6.00 to 6.50
No. 2 busheling 4.50 to 5.00

Rolling Mill Grades:
Steel car axles 15.00 to 15.50
Iron axles 16.00 to 16.50

Cupola Grades:
No. 1 machinery cast 9.75 to 10.00
Stove plate 8.00 to 8.25
Locomotive grate bars 7.00 to 7.50
Steel rails, 3 ft. and under 13.00 to 13.50
Cast iron carwheels 11.50 to 12.00

Malleable Grades:
Industrial 10.00 to 10.50
Railroad 10.00 to 10.50
Agricultural 10.00 to 10.50

Special Grades:
Chemical borings 9.00 to 9.50

BUFFALO Improved Pig Iron Buying—Scrap Believed to Be on Bottom

BUFFALO, July 21.—The past week was a little better in the pig iron selling than the week before. A boiler concern in the East closed for 1000 tons of foundry iron, some of which is believed to have come to Buffalo. An inquiry for 750 tons of foundry, also in the East, is ready to be closed at this writing, and one for 400 to 500 tons of foundry is still pending. Several smaller lots have been quietly closed. Buffalo furnaces find eastern Pennsylvania irons very competitive. Some furnaces are adhering to \$16 minimum on Eastern business, while others are quoting \$15.50 and \$15. The \$14.75 price recently noted is believed to have been an isolated case. There has been no real inside buying in the district, just a few carloads being taken.

Prices per gross ton, f.o.b. furnace:
No. 2 fdy., sil. 1.75 to 2.25 \$17.00
No. 2X fdy., sil. 2.25 to 2.75 17.50
No. 1 fdy., sil. 2.75 to 3.25 18.50
Malleable, sil. up to 2.25 17.50
Basic 17.00
Lake Superior charcoal 25.28

FINISHED STEEL

Operations are continuing about the same in Buffalo mills as heretofore,

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.65c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.10c.
Bands	3.35c.
Hoops	3.90c.
Hot-rolled sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$2.45
Black wire, base per 100 lb.	3.20

Federal Abrasives Co., division of the Swann Corp., has completed betterments and increased capacity of its abrasive plant at Anniston, Ala. Besides an addition to the electric furnace plant, improved special equipment, the result of a long development period, has been installed in the aluminous grain finishing department.

ST. LOUIS

Sheet Sales Holding Up Well—Steel Consumers at 25 Per Cent

ST. LOUIS, July 21.—Sales of both Southern and Northern pig iron continue to be mostly in carload lots for prompt shipment. The total of last week is estimated at several thousand tons, closed at the full price of \$11 f.o.b., Birmingham and \$17.50, f.o.b. Granite City. Because of the small amount of the purchases, melters express little concern about the matter of price. A canvas of iron and steel plants of all kinds in the district is said to indicate activity of about 25 per cent of capacity. Manufacturers of farm implements and stoves in the district and nearby are disheartened over the decline in the price of wheat, which will affect the buying power of the farmer.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$17.50
Malleable, f.o.b. Granite City.	17.50
N'th'n No. 2 fdy., deliv'd St. Louis.	19.66
Southern No. 2 fdy., deliv'd.	15.42
Northern malleable, deliv'd.	19.66
Northern basic, deliv'd.	19.66

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

FINISHED MATERIAL

Sales of the Granite City Steel Co. of sheets for the first half of July were a little greater than the corresponding period in June, despite the advance in prices. There seems to be very little objection to the higher levels on the part of buyers, and the market appears firm. Plates are in demand from the east Texas oil fields, and also heavy hot rolled and annealed sheets. The Colorado & Wyoming Railroad, Pueblo, will receive bids on Aug. 1 for 395 tons of rails, 50,000 spike plates, 575 kegs of standard track spikes, 150 kegs of standard track bolts, 1100 angle bars, etc.

OLD MATERIAL

About the only activity in the market for old material is in the buying by dealers to lay down in their yards. Stocks in hands of yards are said to be large. Consumers show little interest at present. No. 1 locomotive tires are up 25c. a ton and No. 1 rail-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.	3.15c.
Bars, soft steel or iron.	3.00c.
Cold-fin. rounds, shafting, screw stock.	3.35c.
Hot-rolled annealed sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Hot-rolled sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	3.85c.
Galv. corrug. sheets.	4.40c.
Structural rivets.	4.15c.
Boiler rivets.	4.15c.
Per Cent Off List	
Tank rivets, 1/2-in. and smaller, 100 lb. or more.	65
Less than 100 lb.	60
Machine bolts.	60 and 10
Carriage bolts.	60 and 10
Lag screws.	60 and 10
Hot-pressed nuts, sq. blank or tapped, 200 lb. or more.	60 and 10
Less than 200 lb.	50 and 10
Hot-pressed nuts, hex. blank or tapped, 200 lb. or more.	60 and 10
Less than 200 lb.	50 and 10

Sheet Sales Holding Up Well—Steel Consumers at 25 Per Cent

road wrought is 50c. higher, while agricultural malleable is 50c. lower. Railroad lists: Chicago, Burlington & Quincy, 3220 tons; International-Great Northern, 500 tons; Missouri Pacific, 56 carloads; Chicago, Milwaukee, St. Paul & Pacific, 23 carloads; St. Louis-San Francisco, 21 carloads; Pullman Co. (St. Louis), 7 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel.	\$8.25 to \$8.75
No. 1 heavy melting or shoveling steel.	8.00 to 8.50
No. 2 heavy melting or shoveling steel.	7.25 to 7.75

No. 1 locomotive tires.	10.25 to 10.75
Misc. stand.-sec. rails including frogs, switches and guards, cut apart.	9.25 to 9.75
Railroad springs.	10.00 to 10.50
Bundled sheets.	6.00 to 6.50
No. 2 railroad wrought.	8.00 to 8.50
No. 1 busheling.	6.25 to 6.75
Cast iron borings and shoveling turnings.	5.25 to 5.75
Iron rails.	8.00 to 8.50
Rails for rolling.	10.50 to 11.00
Machine shop turnings.	2.75 to 3.25
Heavy turnings.	6.00 to 6.50
Steel car axles.	13.50 to 14.00
Iron car axles.	17.50 to 18.00
Wrot. iron bars and trans.	8.75 to 9.25
No. 1 railroad wrought.	5.50 to 6.00
Steel rails, less than 3 ft.	10.50 to 11.00
Steel angle bars.	8.50 to 9.00
Cast iron carwheels.	7.00 to 7.50
No. 1 machinery cast.	8.00 to 8.50
Railroad malleable.	8.00 to 8.50
No. 1 railroad cast.	8.00 to 8.50
Stove plate.	7.00 to 7.50
Relay rails, 60 lb. and under.	16.00 to 16.50
Relay. rails, 70 lb. and over.	20.00 to 21.00
Agricult. malleable.	7.00 to 7.50

CINCINNATI

Some Increase in Pig Iron Demand But Steel Market Featureless

CINCINNATI, July 21.—With the purchase last week by a Southern Ohio consumer of 500 tons of Northern foundry iron, the weekly tonnage of district furnace representatives increased sharply to 1650 tons. This increased demand, however, is merely the result of sudden requirements of one melter, since the remainder of the business, last week, was in the usual small lots for present needs. The trade, generally, feels that the demand for the summer months will continue at the slow rate of about 1000 tons a week until the early fall, when any change upward in business conditions should reflect almost immediately in heavier purchases of iron. Prices on Northern iron are soft because of the low demand in the competitive areas, although elsewhere in the district, furnaces are adhering to schedules. On the other hand, despite the lack of an active demand for Southern iron, furnaces are consistently quoting the scheduled price.

Prices per gross ton, deliv'd Cincinnati:

Ala. fdy., sil. 1.75 to 2.25.	\$14.69
Ala., fdy., sil. 2.25 to 2.75.	15.19
Tenn. fdy., sil. 1.75 to 2.25.	14.69
S'th'n Ohio silvery, 8 per cent.	23.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

COKE

With the melt low, the specifications for foundry grades of coke are slow.

FINISHED SHEETS

Demand for finished sheets continues at less than 50 per cent of normal, although the level has not changed in the last two weeks. District mill operators anticipate the slow demand will continue throughout the summer. Orders are well diversified and come from widely scattered sources.

OLD MATERIAL

With the Louisville & Nashville list reported to have brought better prices last week, dealers appear to be preparing for better scrap demand. Except for the sale of 1000 tons of No. 2 steel to a district mill, there has been virtually no new business. Another mill, however, lifted the suspension of shipments and accepted some scrap on contract. For the most part, the trade is marking time.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:	
Heavy melting steel.	\$7.25 to \$7.75
Scrap rails for melting.	10.25 to 10.75
Loose sheet clippings.	3.50 to 4.00
Bundled sheets.	6.75 to 7.25
Cast iron borings.	3.75 to 4.25
Machine shop turnings.	4.00 to 4.50
No. 1 busheling.	5.75 to 6.25
No. 2 busheling.	3.75 to 4.25
Rails for rolling.	11.00 to 11.50
No. 1 locomotive tires.	9.50 to 10.00
No. 2 railroad wrought.	7.25 to 7.75
Short rails.	13.00 to 13.50
Cast iron carwheels.	10.50 to 11.00
No. 1 machinery cast.	12.50 to 13.00
No. 1 railroad cast.	11.50 to 12.00
Burnt cast.	5.25 to 5.75
Stove plate.	5.25 to 5.75
Brake shoes.	5.25 to 5.75
Agricultural malleable.	10.00 to 10.50
Railroad malleable.	11.00 to 11.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.	3.25c.
Bars, soft steel or iron.	3.00c.
New billet reinforce. bars.	3.00c.
Rail steel reinforce. bars.	3.00c.
Hoops.	3.90c.
Bands.	3.20c.
Cold-fin. rounds and hex.	3.50c.
Squares.	4.00c.
Hot-rolled annealed sheets (No. 24).	3.75c.
Galv. sheets (No. 24).	4.25c.
Hot-rolled sheets (No. 10).	3.30c.
Structural rivets.	4.20c.
Small rivets.	60 per cent off list
No. 3 ann't'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg (25 kegs or more).	2.95
Cement c't'd nails, base 100 lb. keg.	2.95
Chain, per 100 lb.	10.25
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in.	\$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

▲ Semi-Finished Steel, Raw Materials, Bolts and Rivets ▲

MILL PRICES OF SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	\$29.00 to \$30.00
Rerolling, 4-in. and under 10-in., Youngstown	29.00 to 30.00
Rerolling, 4-in. and under 10-in., Cleveland	29.00 to 30.00
Rerolling, 4-in. and under 10-in., Chicago	31.00 to 32.00
Forging quality, Pittsburgh	35.00

Ores

Lake Superior Ores, Delivered Lower Lake Ports	Per Gross Ton
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron, dry, Spanish or Algerian	.8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic or foundry, Swedish, average 65% iron	9.00c.
Iron ore, basic and foundry, Russian, average 63% iron	9.00c.
Manganese ore, washed 52% manganese, from the Caucasus	.25c. to .27c.
Manganese ore, African or Indian, 50 to 52%	.24c. to .26c.
Manganese ore, Brazilian, 46 to 48%	.22c. to .24c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$12.50

Coke

Furnace, f.o.b. Connellsville prompt	Per Net Ton
Foundry, f.o.b. Connellsville prompt	\$2.40
Foundry, by-product, Ch'go ovens	\$3.25 to 4.50
Foundry, by-product, New England, del'd	7.50
Foundry, by-product, Newark or Jersey City, delivered	10.50
Foundry, by-product, Phila.	8.70 to 9.10
Foundry, Birmingham	9.00
Foundry, by-product, St. Louis, f.o.b. ovens	5.00
Foundry, by-product, del'd St. Louis	8.00
Foundry, by-product, Newark or Jersey City, delivered	9.00
Foundry, by-product, Phila.	5.00
Foundry, Birmingham	8.00
Foundry, by-product, St. Louis, f.o.b. ovens	9.00

Coal

Mine run steam coal, f.o.b. W. Pa. mines	Per Net Ton
Mine run coking coal, f.o.b. W. Pa. mines	\$1.40 to \$1.50
Gas coal, 3½-in., f.o.b. Pa. mines	1.50 to 1.60
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	.90 to 1.00
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Sheet Bars (Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	\$29.00 to \$30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)	Per Gross Ton
Pittsburgh	\$29.00 to \$30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00

PRICES OF RAW MATERIAL

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	\$80.00 to \$85.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*80.00 to 85.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$28.00 to \$30.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50
75%	130.00

Per Gross Ton Furnace	Per Gross Ton Furnace
10%	\$35.00
11%	37.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace	Per Gross Ton
10%	\$25.00
11%	26.00
12%	27.00

Per Gross Ton	Per Gross Ton
13%	\$29.00
14%	31.00
15%	33.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
11%	\$22.00 to \$24.00
12%	23.00 to 25.00
13%	25.00 to 27.00
14%	27.00 to 29.00
15%	29.00 to 31.00

Delivered prices at Chicago are about 50c. a ton below this schedule.

Other Ferroalloys

Ferrotungsten, per lb. contained metal

del'd, carloads

del'd, less carloads

Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr.

delivered, in carloads

Ferrochromium, 2% carbon

delivered, in carloads

Ferrochromium, 0.10% carbon

delivered, in carloads

Ferrovanadium, 0.06% carbon

delivered, in carloads

Ferrocobaltitanium, 15 to 18% carbon

delivered, in carloads

Ferrophosphorus, electric or blast furnace

material, in carloads, 18%, Rockdale, Tenn., base per gross ton

91.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

Per Lb.

Grooved	1.60c. to 1.65c.
Universal	1.60c. to 1.65c.
Sheared	1.60c. to 1.65c.

Wire Rods

(Common soft, base)

Per Gross Ton

Pittsburgh	\$35.00
Cleveland	35.00
Chicago	36.00

MILL PRICES OF BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts

73 and 10

†Carriage bolts

73 and 10

Lag bolts

73 and 10

Plow bolts, Nos. 1, 2, 3 and 7 heads

73 and 10

Hot-pressed nuts, blank or tapped, square

73 and 10

Hot-pressed nuts, blank or tapped, hexagons

73 and 10

C.p.c. and t. square or hex. nuts, blank or tapped

73 and 10

Washers*

7.00c. to 6.75c. per lb. off list

Bolts and Nuts

Per Cent Off List

Semi-finished hexagons nuts

73 and 10

Semi-finished hexagons castellated nuts, S.A.E.

73 and 10

Stove bolts in packages, P'g'h. 80, 10, 10, 10 and 5

Stove bolts in packages, Ch'go. 80, 10, 10, 10 and 5

Stove bolts in pkgs., Cleveland. 80, 10, 10, 10 and 5

Stove bolts in bulk, P'g'h. 80, 10, 10, 5 and 2½

Stove bolts in bulk, Ch'go. 80, 10, 10, 5 and 2½

Stove bolts in bulk, Cleveland. 80, 10, 10, 5 and 2½

Tire bolts

60, 10 and 10

Discounts of 73 and 10 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland \$2.75

F.o.b. Chicago 2.85

Small Rivets

(½-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh 70, 10 and 5

F.o.b. Cleveland 70, 10 and 5

F.o.b. Chicago 70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws 80, 10, 10 and 5

Milled standard set screws, case hardened 80 and 5

Milled headless set screws, cut thread 75 and 10

Upset hex. head cap screws, U.S.S. thread 85 and 10

Upset hex. cap screws, S.A.E. thread 88 and 10

Upset set screws 80, 10 and 5

Milled studs 70

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c. to 1.65c.
F.o.b. Chicago	1.70c. to 1.80c.
Del'd Philadelphia	1.89c. to 1.94c.
Del'd New York	1.93c. to 1.98c.
F.o.b. Cleveland	1.65c. to 1.70c.
F.o.b. Lackawanna	1.70c. to 1.75c.
F.o.b. Birmingham	1.70c. to 1.75c.
C.i.f. Pacific ports	2.10c.
F.o.b. San Francisco mills	2.10c.

Billet Steel Reinforcing

	Base per Lb.
F.o.b. P'gh mills, 40, 50, 60-ft.	1.60c.
F.o.b. Birmingham, mill lengths	1.75c.

Rail Steel

	Base per Lb.
F.o.b. mills, east of Chicago dist.	1.30c. to 1.35c.
F.o.b. Chicago Heights mill	1.60c. to 1.65c.

Iron

	Base per Lb.
Common iron, f.o.b. Chicago	1.70c. to 1.80c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c. to 1.65c.
F.o.b. Chicago	1.70c. to 1.80c.
F.o.b. Birmingham	1.70c. to 1.75c.
Del'd Cleveland	1.781/2c.
Del'd Philadelphia	1.801/2c.
F.o.b. Coatesville	1.70c.
F.o.b. Sparrows Point	1.70c.
F.o.b. Lackawanna	1.70c.
Del'd New York	1.88c.
C.i.f. Pacific ports	2.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c. to 1.65c.
F.o.b. Chicago	1.70c. to 1.80c.
F.o.b. Birmingham	1.70c. to 1.75c.
Del'd Cleveland	1.781/2c.
Del'd Philadelphia	1.801/2c.
F.o.b. Coatesville	1.70c.
F.o.b. Sparrows Point	1.70c.
F.o.b. Lackawanna	1.70c.
Del'd New York	1.851/2c.
C.i.f. Pacific ports	2.05c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
1 in. and narrower, Pittsburgh	1.65c.
Wider than 6 in., P'gh	1.55c.
6 in. and narrower, Chicago	1.75c.
Wider than 6 in., Chicago	1.65c.
Cooperage stock, P'gh	1.75c. to 1.85c.
Cooperage stock, Chicago	1.85c. to 1.95c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.15c.
Strips, Cleveland	2.15c.
Strips, deliv'd Chicago	2.43c.
Strips, Worcester	2.30c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.20c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland)	
To Manufacturing Trade	
Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

	Base per Lb.
Smooth annealed wire	2.25c. to 2.35c.
Smooth galvanized wire	2.70c. to 2.80c.
Polished staples	2.25c. to 2.35c.
Galvanized staples	2.50c. to 2.60c.
Barbed wire, galvanized	2.45c. to 2.55c.
Woven wire fence, per net ton	\$60.00

	Base per Keg
Standard wire nails	\$1.90 to \$2.00
Cement coated nails	1.90 to 2.00
Galvanized nails	3.90 to 4.00

	Base per Lb.
Polished staples	2.45c. to 2.55c.
Galvanized staples	2.70c. to 2.80c.
Barbed wire, galvanized	2.65c. to 2.75c.
Woven wire fence, per net ton	\$65.00

	Base per Lb.
Bright wire	2.30c. to 2.40c.
Smooth annealed wire	2.40c. to 2.50c.
Smooth galvanized wire	2.90c. to 3.00c.

	Base per Keg
Standard wire nails	\$1.90 to \$2.00
Cement coated nails	1.90 to 2.00
Galvanized nails	3.90 to 4.00

	Base per Lb.
Polished staples	2.45c. to 2.55c.
Galvanized staples	2.70c. to 2.80c.
Barbed wire, galvanized	2.65c. to 2.75c.

	Base per Lb.
Bright wire	2.30c. to 2.40c.
Smooth annealed wire	2.40c. to 2.50c.
Smooth galvanized wire	2.90c. to 3.00c.

	Base per Keg
Standard wire nails	\$1.90 to \$2.00
Cement coated nails	1.90 to 2.00
Galvanized nails	3.90 to 4.00

	Base per Lb.
Polished staples	2.45c. to 2.55c.
Galvanized staples	2.70c. to 2.80c.
Barbed wire, galvanized	2.65c. to 2.75c.

	Base per Lb.
Bright wire	2.30c. to 2.40c.
Smooth annealed wire	2.40c. to 2.50c.
Smooth galvanized wire	2.90c. to 3.00c.

Sheets

Hot-Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.70c.
No. 10, f.o.b. Chicago mills	1.80c.
No. 10, f.o.b. Philadelphia	1.99c.
No. 10, f.o.b. Birmingham	1.85c.
No. 10, e.i.f. Pacific Coast ports	2.35c.

(Note: To above prices are added extras for annealing and for width over 48 in., and for less than five tons of each gage or size.)

Hot-Rolled Annealed

	Base per Lb.
No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Chicago mills	2.50c.
No. 24, f.o.b. Philadelphia	2.60c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, e.i.f. Pacific Coast ports	2.85c.

(Note: To above prices are added extras for annealing and for width over 48 in., and for less than five tons of each gage or size.)

Hot-Cold-Rolled

	Base per Lb.
No. 10 gage, f.o.b. Pittsburgh	2.35c.
No. 10 gage, f.o.b. Chicago mills	2.45c.
No. 10 gage, f.o.b. Philadelphia	2.64c.
No. 10 gage, f.o.b. Birmingham	2.50c.

(Note: To above prices are added extras for annealing and for width over 48 in., and for less than five tons of each gage or size.)

Light Cold-Rolled

	Base per Lb.
No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Chicago mills	3.05c.
No. 20 gage, f.o.b. Philadelphia	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.

(Note: To above prices are added extras for annealing and for width over 48 in., and for less than five tons of each gage or size.)

Automobile Body Sheets

	Base per Lb.
No. 20, f.o.b. Pittsburgh	3.10c.
No. 20, f.o.b. Birmingham	3.10c.
No. 20, f.o.b. Pittsburgh	3.10c.
No. 20, f.o.b. Birmingham	3.10c.

(Note: To above prices are added extras for annealing and for width over 48 in., and for less than five tons of each gage or size.)

Terne Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mills	\$5.00
Standard cokes, f.o.b. Gary	5.10

(Per Package, 20 x

Non-Ferrous Metal Markets

Copper Strengthens on Larger Sales—Tin Irregular—Lead and Zinc Firm

NEW YORK, July 21.

COPPER

Primary producers have maintained electrolytic copper at 8c., delivered Connecticut Valley, throughout the week, but custom smelters continued to offer at 7.75c., delivered, until Friday, when foreign purchasing was resumed to the extent of more than 1700 tons. Offers at 7.75c., delivered, were continued on Saturday, but as the buying movement from abroad continued, bringing total export sales for the week to 14,000,000 lb., by Monday all domestic sellers were firmly quoting 8c., delivered, for prompt shipment. Foreign buying stimulated domestic sales, and in addition to prompt shipment business, some sales were made for delivery into September at 8c., delivered. The quotation of Copper Exporters, Inc., continues firm at 8.25c., c.i.f. usual European ports. Despite financial difficulties in recent weeks, German outlets have been responsible for substantially half the recent foreign buying. The firmer position of the copper market is generally attributed to a combination of circumstances, made up of more sanguine reports regarding the European financial crisis, announcement that the Magna Copper Co. will be closed for three months, suspension of the operation of a reverberatory furnace by the Cerro de Pasco company, and action by directors of the Phelps-Dodge Corp., subject to ratification by stockholders, under which 3 1/4 shares of stock are offered, with a bonus of \$2.50 a share, for each share of the Calumet & Arizona Mining Co. Lake copper has been moderately active, and the price is unchanged at 8.12 1/2c. a lb., New York.

TIN

Transactions continue to be influenced to a great extent by changes in the European economic situation and, following two moderately active days on July 15 and 16, the market has been inactive with buying limited to small business. Prices were irregular, ranging from 24.20c. a lb. on July 15 to 25.25c. on July 20, and declining slightly today to 25c. a lb., New York. The London quotation for spot standard fluctuated considerably during the week, and is at £113 15s. today, with future standard

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 21	July 20	July 18	July 17	July 16	July 15
Lake copper, New York.....	8.12 1/2	8.12 1/2	8.12 1/2	8.12 1/2	8.12 1/2	8.12 1/2
Electrolytic copper, N. Y.*.....	7.75	7.75	7.50	7.50	7.50	7.50
Straits tin, spot, N. Y.	25.00	25.25	....	25.25	24.75	24.20
Zinc, East St. Louis.....	3.90	3.90	3.90	3.90	3.90	3.90
Zinc, New York.....	4.25	4.25	4.25	4.25	4.25	4.25
Lead, St. Louis.....	4.22 1/2	4.22 1/2	4.22 1/2	4.22 1/2	4.22 1/2	4.22 1/2
Lead, New York.....	4.40	4.40	4.40	4.40	4.40	4.40

*Refinery quotation; price 1/4c. higher delivered in the Connecticut Valley.
Aluminum, 88 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.75c. a lb., New York.

at £113 15s. and spot Straits at £113 15s. per ton. The Singapore price is £115 12s. 6d. per ton. British warehouse stocks registered a minor decline this week, showing a decrease of 93 tons to 31,845 tons, while shipments from Liverpool were 215 tons. Shipments from Singapore to July 18 totaled 4787 tons.

LEAD

Sales so far this month have been in excess of 35,000 tons, so that sellers continue in a firm position at 4.22 1/2c., East St. Louis, and 4.40c., New York. A substantial volume of buying for prompt shipment is being done, and there is a continuation of small buying for future delivery. Shipments of lead in June totaled 37,063 tons, the third largest month this year. On June 30, stocks had decreased 2672 tons, compared with the end of May.

ZINC

Buying is limited to occasional small lots, but sellers are holding firm at 3.90c., East St. Louis, for prompt shipment, 3.95c. for August and 4c. for September delivery. Small buying is reported for August and a few sales have been made at 4c. per lb., for delivery in September. Firmness of the market is attributed to improved sentiment following recent formation of the European zinc cartel, and continued uncertainty among producers as to the course of ore prices.

ANTIMONY

Demand is decidedly small, with Chinese metal at 6.75c. per lb., duty paid, New York, a decline of 15 points from the quotation a week ago. For September or October delivery at New York, importers quote 6.50c. to 6.87 1/2c. per lb.

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	15.50c.
*Copper, hot rolled, base sizes.....	17.87 1/2c.
<i>Seamless Tubes—</i>	
Brass	20.37 1/2c.
Copper	20.37 1/2c.
Brazed Brass Tubes.....	13.75c.
Brazed Brass Tubes.....	24.37 1/2c.

*Extra for cold-rolled, 3c. per lb.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks.....	9.00c. to 9.50c.
Zinc sheets, open.....	10.00c. to 10.50c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	27.50c. to 28.50c.
Tin, bar.....	29.50c. to 31.50c.
Copper, Lake.....	10.00c. to 11.00c.
Copper, electrolytic.....	9.50c. to 10.00c.
Copper, casting.....	9.25c. to 9.75c.
Zinc, slab.....	5.00c. to 5.50c.
Lead, American pig.....	5.25c. to 6.25c.
Lead, bar.....	7.00c. to 8.00c.
Antimony, Asiatic.....	9.50c. to 10.50c.
Aluminum No. 1 ingots for remelting (guar- anteed over 99% pure).....	20.00c. to 22.00c.
Alum. ingots, No. 12 alloy.....	19.00c. to 21.00c.
Babbitt metal, commercial grade.....	20.00c. to 30.00c.
Solder, 1/2 and 1/4.....	17.75c. to 18.75c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	29.75c.
Tin, bar.....	31.75c.
Copper, Lake.....	9.13c.
Copper, electrolytic.....	8.75c.
Copper, casting.....	8.63c.
Zinc, slab.....	5.50c. to 5.75c.
Lead, American pig.....	5.25c.
Lead, bar.....	7.75c.
Antimony, Asiatic.....	10.00c.
Babbitt metal, medium grade.....	15.00c.
Babbitt metal, high grade.....	34.00c.
Solder, 1/2 and 1/4.....	19.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (All prices are nominal because of uncertain condition of market.)

Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.00c. 6.75c.
Copper, hvy. and wire	5.75c. 6.50c.
Copper, light and bot- toms	4.75c. 5.75c.
Brass, heavy.....	3.25c. 4.00c.
Brass, light.....	2.50c. 3.50c.
Hvy. machine compo- sition	4.75c. 5.50c.
No. 1 yel. brass turn- ings	3.50c. 4.25c.
No. 1 red brass or compos. turnings	4.25c. 5.00c.
Lead, heavy.....	3.25c. 3.75c.
Zinc	1.50c. 2.00c.
Sheet aluminum.....	9.50c. 11.50c.
Cast aluminum.....	3.50c. 6.00c.

FABRICATED STRUCTURAL STEEL

New Projects of 49,500 Tons Include Post Office in New York and Bridge in Louisiana

NEW fabricated structural steel projects at 49,500 tons are more than double the totals of the two previous weeks. Included are 15,000 tons for a parcel post building in New York, 10,000 tons for a bridge and highway construction for Louisiana, 7500 tons for transmission towers from Peoria to Chicago for the Insull interests and 8000 tons for a naval air base at Sunnyvale, Cal.

Awards were for about 17,000 tons. Except for a 2000-ton high school in Chicago, projects were all relatively small. A bridge in Chicago for the Chicago, Burlington & Quincy Railroad calls for 950 tons, interurban railroad bridges in Milwaukee, 800 tons, a train shed at Dallas, Tex., 700 tons, a State prison at Wallkill, N. Y., 800 tons and a grade crossing separation at Toledo for the Nickel Plate railroad, 825 tons. Awards follow:

North Atlantic States

BOSTON, 350 tons, city printing plant, to Boston Structural Steel Co., Inc.

BOSTON, 231 tons, intermediate school, to Boston Structural Steel Co., Inc.

WAVERLY, MASS., 115 tons, Nurses' Home, to A. O. Wilson Structural Co., Cambridge.

HARTFORD, CONN., 150 tons, municipal hospital, to Topper & Griggs, Hartford.

WORCESTER, MASS., 140 tons, Worcester County Tuberculosis Hospital, to McClintic-Marshall Corp.

STATE OF NEW YORK, 300 tons, highway bridges, award of July 7, to Scott Brothers.

STATE OF NEW YORK, 400 tons, highway bridges, to American Bridge Co.

ALBANY, N. Y., 400 tons, College of St. Rose, to Eastern Bridge & Structural Co.

WALLKILL, N. Y., 800 tons, State prison, to Ingalls Iron Works.

WHITE PLAINS, N. Y., 130 tons, building for Grasslands Hospital, to McClintic-Marshall Corp.

JAMAICA, N. Y., 350 tons, office building at Jamaica Avenue and New York Boulevard, to Berkshire Iron Works.

NEW YORK, 450 tons, viaduct at New York Central Railroad's Thirtieth Street yards, to American Bridge Co.

WILMINGTON, DEL., 180 tons, school, to Bethlehem Fabricators, Inc.

HARRISBURG, PA., 100 tons, bridges for Reading Railroad, to McClintic-Marshall Corp.

YORK, PA., 145 tons, grain warehouse, to Dietrich Brothers.

YORK, 545 tons, reconstruction of two buildings, to Shoemaker Bridge Co.

MOUNT VERNON, N. Y., 150 tons, school, to Levine Iron Works.

STATE OF PENNSYLVANIA, 145 tons, Luzerne County bridge, to McClintic-Marshall Corp.

PITTSBURGH, 115 tons, Superior Paper Co. building, to Fort Pitt Bridge Works Co.

WASHINGTON, 2225 tons, Standard Oil Co. office building, to American Bridge Co.

South and Southwest

DALLAS, TEX., 700 tons, train shed for Texas & Pacific, to Mosher Steel & Machinery Co.

GUTHRIE, OKLA., 400 tons, highway bridge, to Stupp Brothers Bridge & Iron Co.

PHOENIX, ARIZ., 400 tons of sheet steel piling for Rio Puerco bridge, to Jones & Laughlin Steel Corp.

Central States

TOLEDO, 675 tons, Wabash Railroad grade crossing separation; 415 tons to American Bridge Co. and 260 tons to McClintic-Marshall Corp.

TOLEDO, 825 tons, grade crossing elimination for Nickel Plate Railroad, to American Bridge Co.

CLEVELAND, 190 tons, Chronic Hospital, to Reliance Structural Steel Co.; previously reported to an unnamed fabricator.

CHICAGO, BURLINGTON & QUINCY RAILROAD, 950 tons, bridges; 450 tons to American Bridge Co., 500 tons to McClintic-Marshall Corp.

MILWAUKEE, 800 tons, bridges for interurban railway extension, T. M. E. R. & L. Co., divided among six Milwaukee fabricators.

CHEROKEE, IOWA, 240 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.

ADEL, IOWA, 215 tons, bridge, to Pittsburgh-Des Moines Steel Co.

WEST VIENNA, ILL., 200 tons, highway bridge, to Clinton Bridge Co.

CHICAGO, 2000 tons, Wells Junior High School, to Eggers Schillo Co., local.

STATE OF NEBRASKA, 150 tons, bridges, to Paxton-Vierling Iron Works.

Western States

SAN FRANCISCO, 230 tons, Marion Realty Co. apartment buildings, to McClintic-Marshall Corp.

SAN FRANCISCO, 240 tons, plate girders for Southern Pacific, to Virginia Bridge & Iron Co.

SAN FRANCISCO, 685 tons, health center building, to McClintic-Marshall Corp.

OAKLAND, CAL., 100 tons, Borrman Steel Co. warehouse, to Pacific Coast Engineering Co.

LOS ANGELES, 110 tons, Marathon Theater alteration, to Consolidated Steel Co.

Canada

KINGSTON, ONT., 225 tons, building for Sisters of Charity, to Disher Steel Construction Co., Toronto.

TORONTO, 150 tons, addition to Morse Street school, to John T. Hepburn, Ltd.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

BELCHERTOWN, MASS., 250 tons, State water diversion tunnel.

FOXBORO, MASS., 200 tons, two State bridges.

BOSTON, 150 tons, Shawmut Avenue bridge.

NEW YORK, 15,000 to 16,000 tons, Parcel Post building; bids opened Aug. 20 by supervising architect, Treasury Department.

PENNSYLVANIA RAILROAD, 600 tons, bridges at Chicago, Pittsburgh and Lancaster, Pa.; bids in.

NEW YORK, 1500 tons, alterations and additions to Harlem Hospital.

BROOKLYN, 800 tons, public schools Nos. 236 and 248.

BROOKLYN, 340 tons, alterations and addition to Bay Ridge Union Church, Eighty-first Street.

BROOKLYN, 300 tons, power house for Kings County Hospital.

COMSTOCK, N. Y., 250 tons, railroad bridge.

ROCHESTER, N. Y., 1000 tons, Charlotte High School, Leach Steel Co. low bidder.

ERIE, PA., 300 tons, Y. M. C. A. building, plans revised and new bids asked.

STATE OF NEW JERSEY, 1900 tons, route 25, viaduct.

STATE OF NEW JERSEY, 250 tons, highway bridges.

PITTSBURGH, 350 tons, three oil barges for Pure Oil Co.

The South

STATE OF LOUISIANA, 10,000 tons, bridge and highway work.

Central States

PEORIA, ILL., 200 tons, approach to Cedar Street bridge.

CHICAGO, 2300 tons, electrical group for World's Fair; W. E. O'Neill, general contractor.

CHICAGO, BURLINGTON & QUINCY, 500 tons, bridge work.

CHICAGO, 7500 tons, transmission lines from Peoria to Chicago for Insull interests.

READSTOWN, WIS., 300 tons, State highway bridge; Peppard & Fulton Co., Minneapolis, low bidder on general contract.

Western States

HELENA, MONT., 350 tons, Post Office.

STATE OF MONTANA, 415 tons, Big Horn River highway bridge.

SUNNYVALE, CAL., 8000 tons, naval air base hangar and other structures.

SACRAMENTO, CAL., 650 tons, two highway bridges.

SEATTLE, 5000 tons, transmission towers for municipal project.



National Steel Barrel Co., Cleveland, has moved its New Orleans office and equipment to 2126 Poland Street, that city.

British and Continental Business Awaits Result of Debt Conference

(By Cable)

LONDON, ENGLAND, July 20.

BRITISH business is anxiously awaiting the outcome of the international conference on war debts.

Iron and steel markets are quiet with the Scottish holidays accentuating the dullness. Five Scottish blast furnaces have been blown out, leaving only one operating.

Cleveland pig iron consumers are still pressing for price reductions, but makers are adamant, despite increased competition and lack of export trade.

Finished steel is quiet, but some semi-finished orders have been secured as a result of the recent firmness on the Continent. Finished material is especially quiet for shipbuilding and in export trade, so that plants are operating irregularly.

The Continental Steel Cartel meeting scheduled for last week has been postponed indefinitely because of the inability of German delegates to attend. The market, consequently, is uncertain and considerable business has been suspended.

British users of semi-finished steel have bought small lots, but neither buyers nor sellers are seeking business under present conditions. Steel prices are generally steady, but mild steel bars have sold at concessions.

Tin plate demand is influenced by the German situation, but makers' order books are better filled than a month ago and output is at 60 to 65 per cent.

Inquiry for tin plate is broadening

Belgian steel mills consider a joint export organization for Indian trade

* * *

Japanese Government Works books first sheet piling order of 737 tons at \$60.88 a ton.

* * *

Japanese industrial survey suggests expansion aided by tariff to employ 40,000 more workers.

* * *

Soviet manganese ore to be bought by Continental mills which have received 900,000 tons of Russian orders this year.

* * *

and good business is expected when the Continental financial situation has cleared. Southern European packers are affected by a drought and are not anxious to place forward contracts. Canadian seasonal requirements have been satisfied, but certain small inquiries are being received and the Far East, including China and Australia, is showing renewed interest in buying. Galvanized and black sheets continue quiet.

The English Electric Co. has secured a contract totaling £150,000 (\$729,000) for electrical equipment in the new South African steel works at Pretoria.

Lloyd's shipbuilding report for June shows British tonnage under construc-

tion to be only slightly more than 500,000 tons, representing 30.4 per cent of the world total.

The Continental Wire Rod Cartel will meet in Luxemburg, Sept. 3, to discuss its renewal for several years.

Belgian steel companies are reported to be negotiating the establishment of a joint export organization for British India.

French merchant bar mills have formed a syndicate, effective Aug. 1, with a system of quotas operating from July 15.

The Soviet Union is negotiating for 25,000 tons of rails with Czechoslovakian mills.

German pig iron output in June was 575,000 tons, with 61 furnaces active at the end of the month.

Russian output in June was 314,000 tons of pig iron, compared with a program of 394,000 tons. Raw steel output was 256,000 tons, compared with a program of 382,000 tons.

Survey Urges Japanese Industrial Expansion

YOKOHAMA, JAPAN, June 17.—A survey concluded by the Department of Commerce and Industry suggests that certain industries in Japan should be expanded to meet the requirements of the domestic market. Increase of production is recommended for road machinery, dredges, pile drivers and

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at \$4.8665 (par)

British Prices, f.o.b. United Kingdom Ports

Ferromanganese, export.	£9 0s.	\$43.74
Billets, open-hearth....	5 0 to £5 7½s.	24.30 to \$26.12
Black sheets, Japanese specifications.....	10 5	49.82
Tin plate, per base box..	0 13½ to 0 14	3.25 to 3.40
Steel bars, open-hearth..	7 17½ to 8 7½	1.71 to 1.81
Beams, open-hearth....	7 7½ to 7 17½	1.60 to 1.71
Channels, open-hearth....	7 12½ to 8 2½	1.66 to 1.76
Angles, open-hearth....	7 7½ to 7 17½	1.60 to 1.71
Black sheets, No. 24 gage	8 10	1.84
Galvanized sheets, No. 24 gage	9 7½ to 9 10	2.03 to 2.06

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	f2 8s. to f2 9s.	\$11.66 to \$11.91
---	------------------	--------------------

Billets, Thomas.....	£3 7s.	to £3 8s.	\$16.28 to \$16.52
Wire rods, low C., No. 5 B.W.G.....	5 0	to 5 5½	24.30 to 25.64
Rails, light.....	6 0		29.20
Black sheets, No. 31 gage, Japanese	11 5	to 12 12	54.68 to 58.32
Steel bars, merchant....	3 10	to 3 11	0.76 to 0.77
Beams, Thomas, British standard (nominal)...	3 8½	to 3 10	0.74 to 0.76
Channels, Thomas, American sections	5 12	to 5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over ¾-in. thick	3 10	to 3 11	0.76 to 0.77
Angles, Thomas, 3-in....	3 12	to 3 13	0.78 to 0.79
Hoops and strip steel over 6-in. base	4 5		0.94
Wire, plain, No. 8 gage..	5 0		1.09
Wire, barbed, 4-pt. No. 12 B.W.G.....	8 15		1.89

similar equipment, generators, motors and certain machine tools, including automatic lathes; spinning machines, oil engines, sewing machines, automobiles, steel sheets, pipe, wire rods and sheet piling. The survey suggests that adequate expansion, aided by tariff protection, would provide employment for 40,000 additional workers. For example, the present automobile output of Japan is valued by the survey at 10,000,000 yen (\$4,930,000) annually, and the average imports are 20,000,000 yen (\$9,860,000) annually. Expansion in automobile output would provide employment for about 10,000 additional workers, according to the survey.

Aluminum Stocks Are Increasing

HAMBURG, GERMANY, July 11.—Stocks of aluminum in Europe and North America are estimated by German producers at 150,000 tons, the total production of about nine months. Stocks are reported to be showing further increases, and German makers are considering reductions in price to bring aluminum into closer competition with copper, as an alternative to drastic curtailment of output.

Japanese Mill Sells First Sheet Piling

YOKOHAMA, JAPAN, June 17.—The first order for sheet piling developed by the Government Steel Works has been placed by the Nagoya Municipal Harbor Office on a low bid by the Mitsubishi Trading Co. to furnish 3409 sections, totaling 737 tons, at 123.50 yen (\$60.88) a ton. Nagoya municipality is preparing an inquiry for sheet piling, and, as a result of the low price quoted on the first order, the Japanese maker expects to obtain this contract also.

German Iron Ore Mine Subsidy Continued

HAMBURG, GERMANY, July 11.—The Government has decided to continue payments of the subsidy to the iron ore industry for the rest of this year, as the mine operators informed the Government that it would be necessary to suspend operation of all mines at once if the subsidy is not continued. Payments for the second quarter totaled 860,000 m. (\$205,000).

The mines have high production costs because of their great depth and constant trouble with water. Prior to the war, German iron ore require-

ments were almost wholly satisfied from Lorraine, the Saar and Upper Silesia, with a small tonnage from the Siegerland mines. These mines now contribute about 25 per cent of requirements, and it is pointed out that, should Germany be blockaded, more than 50 per cent of the steel industry would be forced to close down from lack of iron ore.

Wire Rod Cartel Renewed to Year End

HAMBURG, GERMANY, July 11.—The Continental Wire Rod Cartel has been extended to the end of this year, and the total allotment for members set at 390,000 tons for the third quarter. In prolonging the life of the cartel, it was necessary to grant concessions to the Belgian members, and German mills were given a special export allotment. Prices are unaltered at £5 (\$24.30) a metric ton, f.o.b. port.

European Mills to Buy Soviet Manganese Ore

BERLIN, GERMANY, June 10.—The Continental distributor of Russian manganese ore, the Rawack & Grunfeld A. G., has confirmed the report that Germany, Poland and Czechoslovakia, in return for almost 900,000 tons of steel products awarded to them by the Soviet since Jan. 1, will place all manganese ore requirements with the Soviet until the end of 1932. These purchases will be subject to the price being equal to ores from India, Brazil and Africa.

To Cut Zinc Production

WASHINGTON, July 21.—The international zinc cartel meeting at Ostend, Belgium, has agreed to cut production 45 per cent from normal levels, effective from Aug. 1 to Dec. 31, 1932. Then it is automatically renewable unless denounced by a three months' notice, according to a telegram from Commercial Attaché R. C. Miller, Brussels. The basis of normal production has not yet been definitely settled but the level for some three-month period between 1925 and 1927 is being considered.

The percentage reduction may be modified with price improvement, the agreement indicates. Special arrangements are to be made for the control of existing stocks. The countries signing the agreement are Belgium, France, Germany, Poland, England, Norway, Czechoslovakia, Italy, Australia, Canada and Mexico.

United States Buys German Alloy Scrap

HAMBURG, GERMANY, July 11.—German holders of alloy steel scrap, especially tungsten-bearing material, have recently been able to secure export permits for this material, previously refused by the Government. As a result, fair-sized shipments of tungsten scrap are being made to the United States, which has heretofore imported it from the United Kingdom.

Japan Plans to Make Large Steel Pipe

YOKOHAMA, JAPAN, June 17.—Negotiations are being conducted by the Japan Steel Tube Co. with a European maker of 6-in. and larger steel pipe for oil and gas to obtain a license for manufacture in Japan. Japanese annual requirements of about 20,000 tons of these sizes are almost entirely imported from Germany and France.

Canadian Tariff Changes

WASHINGTON, July 21.—Further proposed Canadian tariff changes provide that seamless iron or steel tubing for use in well drilling must be over 8 in. in diameter, instead of 4 in., as formerly, to be admitted free of duty. The changes, effective provisionally from June 2, subject to approval by Parliament, provide for increased rates of duty on 20 or 30 additional items, according to a report received from Assistant Commercial Attaché Oliver B. North, Ottawa.

Articles of iron or steel, cold rolled, when imported by manufacturers for use exclusively in the manufacture of sheets coated with tin, are to be admitted free of duty until Sept. 1, 1931, when the rates of 10 per cent general, 7½ per cent intermediate, and 5 per cent preferential, will become effective. Shipments from the United States take the general rate.

German Railroads Stop Car Buying

HAMBURG, GERMANY, July 11.—The German Railways Administration has issued a statement that no railroad rolling stock will be ordered for the next three years, all expenditures for this period to be devoted to track repairs. If this decision is adhered to, a majority of German car shops will probably close, dismissing 15,000 to 20,000 workmen, as only a small volume of export business can be obtained. The Linke-Hoffmann-Busch Works has just booked an order from the Soviet Union for 400 refrigerator cars to cost \$2,200,000.

PLANT EXPANSION AND EQUIPMENT BUYING



Dullness Continues in Machine Tool Trade

SINGLE orders of small aggregate volume and apparently restricted to urgent needs continue to characterize the machine tool market. On the whole, little improvement is expected before fall.

Inquiries also are scarce, although a slight improvement is noted in Boston, Pittsburgh and some other centers. In Chicago a few old inquiries have been revived, and in Milwaukee the slightly better volume includes inquiry from automotive sources. Interest in future requirements is also reflected, perhaps, in the attendance

at a demonstration of new milling machines in Milwaukee last week, the visitors to this show numbering more than 900.

The Chicago Board of Education has issued a list of eight tools for the Jackson Junior High School. There is some promise that the list for the Austin High School, Chicago, which has been pending for some time, will be acted upon next week.

Bids for the 17 lathes and several other tools for the Brooklyn Navy Yard have been closed, as have those for the lathes for the Continuation

School for Boys at Boston; but awards have not been made.

Machine tool orders dropped sharply in June, as compared with May, according to the monthly report of the National Machine Tool Builders' Association. The June index figure of sales was 73.6, against 87.2 in May and 105.1 in April. Machines of medium size suffered the greatest drop, 39 per cent from May, while those of the largest size suffered the least, 9 per cent. Shipments were at about the May level, showing no apparent tendency to delay deliveries.

NEW YORK

Bids have been closed by the Navy Department on 17 lathes and several other tools for the Brooklyn Navy Yard. Awards probably will be made soon. This business is all of importance that is in immediate prospect in the New York district. Within a month or six weeks the Board of Transportation of New York may, however, buy the 50 or more machines that are needed to equip the 207th Street subway repair shops. The market otherwise holds nothing of promise. Current business is almost at a standstill, being smaller in volume than that of June.

PITTSBURGH

Conditions in the local machinery market this month have changed but little, although some sellers report a slight increase in inquiry. While few buyers have issued anything as definite as specifications, many are beginning to consider their fall needs and will undoubtedly enter the market if there are signs of general business improvement.

No sizable lists are before the trade and buying by the railroads is almost entirely lacking. The crane market is equally dull, but some of the larger

steel companies in the district are said to have plans under consideration which will call for cranes as well as large equipment. Heavy equipment builders are still fairly well supplied with backlog orders, but in some cases delivery has been moved forward and steel mill machinery makers are not as rushed as early in the year.

NEW ENGLAND

The city of Boston closed bids July 20 on a small number of lathes for the Continuation School for Boys, but has made no awards. Local dealers continue to report a dearth of business, but state that quite a few manufacturing plants the past week made inquiries regarding prices and delivery dates on various types of machines. They are of the opinion that business will pick up in September, if not before. New England machine tool builders generally have no new bookings or inquiries.

MILWAUKEE

Scattering orders for one or two machines continue to break the monotony of dullness in the market. Volume of sales remains sharply restricted and users come into the market only for the most urgent needs.

Inquiry has improved slightly, and it is considered significant that the automotive industries are more generally represented, probably with a view of anticipating requirements for the new models. The stagnation of industry appears to be lifting slightly, although at a comparatively slow rate, which has been accentuated by the recurrence of an extreme heat wave the past week.

CINCINNATI

Occasional small orders for single machines continue to dribble in, but the market remains lifeless. Inquiries are slow, although in some instances manufacturers find a more encouraging tone. Plants are still operating at a low rate and little change is expected before fall.

CLEVELAND

The machine tool market continues to drag, with business so light that the trade feels that it can get no worse. Virtually no new inquiry is coming out. Sales are confined almost wholly to small tools. Dealers are attempting to close orders against some inquiries which have been pending several months, but prospective purchasers declare they will not do



Flat wire for the *particular*



OUR customers order hundreds of different kinds of flat wire. But common to all of them is this fact:—they are particular.

We attract and hold "hard-to-please" customers because they find that we meet their most exacting flat wire requirements. For years we have specialized in flat wire of the very highest quality and have one of the largest flat wire plants in the country. Cold rolled high or low carbon steel. Made in various widths, thicknesses and finishes including galvanized and tinned.

JOHN A. ROEBLING'S SONS CO., TRENTON, N.J.

WIRE • WIRE ROPE • COPPER AND INSULATED WIRES AND CABLES
WELDING WIRE • FLAT WIRE • WIRE CLOTH AND WIRE NETTING

New York Boston Chicago Philadelphia Atlanta San Francisco
Cleveland Los Angeles Seattle Portland Export Dept., New York, N.Y.

ROEBLING FLAT WIRE

anything until their business improves. No improvement is expected in August.

CHICAGO

The pace of the machine tool market remains slow and no developments of importance point to betterment. Auctions of shop equipment are becoming increasingly common and there is more disposition for users to offer individual machines for sale. Fresh inquiries are scarce and there is nothing in the way of a list. Some dealers sense improvement in the form that a few old inquiries, long dormant, have been revived, but on the whole buyers are studying cash reserves, and an order means that the equipment was urgently needed. There is some promise that the list for the Austin High School, Chicago, will be acted upon next week. The Chicago Board of Education has issued the following inquiries for the Jackson Junior High School:

One 16-in. band saw, one 6-in. jointer on floor stand, four motor-in-head speed lathes, an oil stone grinder, one $\frac{1}{2}$ -in. portable electric grinder, one two-wheel floor grinder, 10 in. x 1 in.

▲ ▲ ▲

New York

PLANS are under way by Ethyl Gasoline Corp., 135 East Forty-second Street, New York, for a new laboratory and gasoline-testing unit at Baton Rouge, La., to cost over \$100,000 with equipment. Company is a joint interest of Standard Oil Co. of New Jersey, 26 Broadway, New York, and General Motors Corp., Detroit.

Rand Rubber Co., 397 Sumner Avenue, Brooklyn, manufacturer of special rubber products, has awarded general contract to Sraer & Tueru, Brooklyn, for three-story addition, including improvements in present factory, to cost over \$70,000 with equipment. Michl Mario, 200 Beverly Road, Brooklyn, is architect.

Anthony H. G. Fokker, care of Fokker Aircraft Corp., General Motors Building, New York, is organizing International Fokker Co., to manufacture metal airplanes and parts. New organization will establish one or more plants at sites to be selected in United States and also proposes to operate similar plants in other countries. Company will be identified with Dutch Fokker Aircraft Co., Amsterdam, Holland, with which Mr. Fokker is connected. Albert A. Gassner, recently chief engineer for General Aviation Corp., General Motors Building, will be an official of new company. Mr. Fokker has recently resigned as director of engineering for Fokker Aircraft Corp., affiliated with General Motors Corp.

Roy Eddinger, Watervliet, N. Y., and associates have organized Welding Boiler & Machine Shop, Inc., Albany, N. Y., and will operate plant at last-noted place for manufacture of boilers and other plate products. Company is represented by N. Barnard Silberg, 168 South Pearl Street, Albany.

Department of Hospitals, Municipal Building, New York, will receive bids until July 30 for addition to steam power house at Kings County Hospital, Brook-

lyn. LeRoy P. Ward, 205 East Forty-second Street, New York, is architect.

Berger Mfg. Co., Belden Boulevard, N. E., Canton, Ohio, manufacturer of metal furniture, a subsidiary of Republic Steel Corp., Youngstown, has leased 21,000 sq. ft. of floor space in building No. 7 of Robert Gair Co., Washington Street, Brooklyn, for new factory branch, storage and distributing plant.

Plattsburg Broadcasting Corp., Plattsburg, New York, is planning erection of new radio broadcasting station, including steel towers, power house and other facilities.

Hilo Varnish Co., Marcy and Flushing Avenues, Brooklyn, has awarded general contract to Turner Construction Co., Graybar Building, New York, for new plant, consisting of three-story and basement factory, with three one-story units adjoining, to cost over \$150,000 with equipment.

Correct Die Cutting Works, Inc., New York, recently organized, will take over and expand Correct Die & Pattern Works, Inc., with plant at 151 West Twenty-fifth Street. Ernest Parlow and L. D. Malin are principal incorporators of new company.

George A. LaMonte & Son, 229 Kingsland Road, Nutley, N. J., manufacturer of paper products, has asked bids on an addition, two and three stories and basement, to cost over \$65,000 with equipment. Jardine, Murdock & Wright, 347 Madison Avenue, New York, are architects.

Board of Education, 31 Green Street, Newark, will receive bids until July 30 for metal cutting shear, baling presses, steel cabinets, steel tables and stools, benches and modeling stands, gas kiln and other equipment. R. D. Argue is secretary.

Board of Education, Rahway, N. J., contemplates installation of manual training equipment in new two-story and basement junior high school, to cost about \$475,000, for which plans are being drawn by Seymour Williams, 146 Irving Street, architect.

Moeltner Co., Inc., Montclair, N. J., has been organized to take over and expand Moeltner Sheet Metal & Roofing Co., with works at 100 Greenwood Avenue. John Moeltner heads new organization.

Board of Education, Lakewood, N. J., contemplates installation of manual training equipment in new high school to cost over \$350,000, for which preliminary sketches are being arranged by Clinton B. Cook, Asbury Park Trust Building, Asbury Park, N. J., architect.

Lummus Co., subsidiary of Babcock & Wilcox Co. and Superheater Co., New York, is building a high-pressure cracking unit, with daily capacity of 4500 bbl., for Tide Water Oil Co., Bayonne, N. J.

Bound Brook Oil-less Bearing Co., Bound Brook, N. J., has organized Fischer Foundry Corp., a subsidiary, which will manufacture bronze and aluminum castings at former's foundry in Middlesex Borough, N. J. Officers of new company are W. F. Jennings, president; L. A. J. and C. J. G. Fischer, vice-presidents; G. O. Smalley, treasurer; H. O. Johnson, secretary.

Addison D. Putnam, 79 East Fulton Street, Gloversville, N. Y., and associates have organized Sacandaga Aircraft, Inc., with capital of \$10,000, and plan operation of local works for manufacture of airplanes and parts. Harold E. Hotaling, 14 Saratoga Boulevard, is interested in company.

Philadelphia

PLANS have been filed by I. T. E. Circuit Breaker Co., Nineteenth and Hamilton Streets, Philadelphia, for an addition to steam power house, to cost about \$30,000 with equipment. J. Fletcher Street, 1120 Locust Street, is architect.

Department of Wharves, Docks and Ferries, Pier No. 4 South, Philadelphia, Richard Weglein, director, will receive bids until July 27 for work at Race Street Pier No. 11, North, including installation of electric system, steam supply and water system.

Brilliant Mfg. Co., 1035 Ridge Avenue, Philadelphia, manufacturer of electric signs, displays, etc., has leased part of building at 1024-28 Buttonwood Street for expansion.

Standard Oil Co. of New Jersey, 26 Broadway, New York, has asked bids on general contract for new bulk oil storage and distributing plant on 20-acre tract recently acquired at East Burlington, N. J., to cost over \$85,000 with equipment.

J. T. Baker Chemical Co., 335 Broad Street, Phillipsburg, N. J., manufacturer of industrial chemicals, plans rebuilding part of storage and distributing plant recently destroyed by fire, with loss of about \$25,000. Company is interested in Taylor Chemical Corp., recently organized to take over and expand plant and business of company of same name, with offices at 420 Lexington Avenue, New York. Baker company will be in charge of sales. Plant will be continued at Penn Yan, N. Y.

Board of Education, Pottsville, Pa., will take bids on general contract before close of month for new high school to cost about \$1,000,000. Manual training department will be installed. William B. Ittner, Inc., 3615 Olive Street, St. Louis, is architect.

City Council, Dover, Del., is considering purchase of former cannery plant of Liberty Brand Mfg. Co., and will remodel for storage and distributing plant for municipal machinery and equipment, including repair and service facilities.

Selden-Hahn Truck Corp., Allentown, Pa., recently organized, will take over and expand Selden-Hahn Motor Truck Corp., with local plant for manufacture of motor trucks, buses, etc., including parts and assembling. L. K. Gordon and H. D. Danke, 234 North Thirteenth Street, head new organization.

Krebs Pigment & Color Corp., Wilmington, Del., is being organized as a joint interest of E. I. duPont deNemours & Co., Wilmington; Graselli Chemical Co., Cleveland, and Commercial Solvents Corp., 230 Park Avenue, New York, to consolidate lithophone and dry color manufacturing business of Krebs Pigment & Chemical Co., Newport, Del., a subsidiary of duPont company, pigment and dry color division of Graselli company, and Commercial Pigments Co., a subsidiary of Commercial Solvents Corp. Consolidated organization will operate plants at Newport, Del., Newark, N. J., and Baltimore. Main works will be developed at Newark, where headquarters will be established. Carl H. Rupprecht, heretofore manager of Pigment & Dry Color Division of Graselli company, will be president of consolidated interest.

E. L. Austin, 716 Land Title Building, Philadelphia, has been appointed Federal equity receiver for L. D. Berger Co., 59 North Second Street, Philadelphia, manufacturer of sheet metal specialties.

Many a man has put
confidence in them



TOO MANY misfits turned one man toward better cap screws. Too many heads twisted off in hurried assemblies made another look around for a better product. Too many burred threads caused a third to investigate our contention that Cleveland Cap Screws made by the Kaufman Method of extrusion were a decided step forward in cap screw manufacture. Letters on file

to this effect are evidence of one kind. Re-orders are stronger evidence. We have both. Possibly Cleveland Cap Screws have advantages for you.

THE CLEVELAND CAP SCREW COMPANY
2930 E. 79th St., Cleveland, Ohio

Address the Nearest Company Warehouse—Complete stocks at
CHICAGO, 726 W. Washington Blvd.
DETROIT, 520 W. Congress Street
PHILADELPHIA, 12th & Olive Sts.
SAN FRANCISCO, 548 Howard St.
NEW YORK . . . 47 Murray Street
LOS ANGELES . . . 224 E. 11 Street

C L E V E L A N D C A P S C R E W S

Buffalo

PLANS have been filed by Jamestown Iron Works, Taylor Street, Jamestown, N. Y., manufacturer of gray iron castings, for one-story addition, 60 x 100 ft., to cost about \$50,000 with equipment.

In connection with expansion program of duPont Cellophane Co., Inc., River Road, Buffalo, manufacturer of transparent wrapping materials to cost about \$2,000,000, its affiliated interest, Canadian Industries, Ltd., Montreal, plans erection of new plant at Three Rivers, Que., for similar production, to cost close to \$1,500,000 with machinery. Both companies are subsidiaries of E. I. duPont deNemours & Co., Wilmington, Del., for which duPont Engineering Co., duPont Building, Wilmington, is engineer.

Buffalo Cement Burial Vault Co., Inc., foot of Hudson Street, Buffalo, is planning to rebuild part of plant recently destroyed by fire, with loss of about \$40,000 including equipment.

Loblaw Groceries, Inc., 168 Chandler Street, Buffalo, will proceed with superstructure for a new four-story and basement storage and distributing plant, 220 x 300 ft., for which general contract recently was let to J. W. Cowper Co., Niagara Square, to cost over \$400,000, with conveying and other equipment.

Interest connected with Republic Metalware Co., 90 Alabama Street, Buffalo, headed by C. Sidney Shepard, chairman of board, have secured a majority of capital stock of Central Stamping Co., 591 Ferry Street, Newark, N. J., manufacturer of stamped tinware and kindred products, and will be active in management.

▲▲▲

Milwaukee

BOARD of Vocational Education, Manitowoc, Wis., will open bids Aug. 8 for new manual training and domestic science institute, 79 x 320 ft., with wing, 53 x 100 ft., all two stories and basement. Plans are by William J. Raeuber, local architect, 926 South Eighth Street. Otto H. Senglaub is chairman of board.

Folding Furniture Works, Inc., Stevens Point, Wis., has broken ground for new plant costing about \$100,000 with equipment, to replace factory burned in May. Main building will be 60 x 240 ft., two stories; warehouse, 80 x 100 ft., and office, 36 x 56 ft. John S. Wozalla is general manager.

Post-Crescent Publishing Co., 123 South Appleton Street, Appleton, Wis., will open bids Aug. 6 for new \$125,000 newspaper plant, 83 x 110 ft., two stories and basement, designed by Foeller, Schober & Berners, architects, Green Bay, Wis.

General Box Co., Sheboygan, Wis., has placed general contract with Universal Building Corp., local, for new factory to cost \$65,000, replacing plant recently burned. Project is being handled by Frank D. Chase, Inc., consulting engineer, 720 North Michigan Avenue, Chicago. Merton C. Hillyer is vice-president in charge.

Western Printing & Lithographing Co., 1212 Mound Avenue, Racine, Wis., has commissioned Austin Co., Cleveland, to design and erect plant extension to cost \$75,000.

Everbrite Co., Inc., 1440 North Fourth Street, Milwaukee, manufacturer of illuminated advertising signs, has started

work on a factory extension, 50 x 60 ft., part two stories and basement.

A-C Metal Specialties, Inc., 100-106 East Walnut Street, Milwaukee, has purchased all equipment and good will of Acme Automotive Accessories, American Sash Pulley Corp. and Velguth Metal Parts, Inc.

Worden-Allen Co., Milwaukee, structural steel fabricator, has entered agricultural field with a line consisting of an all-steel silo, steel grain bin and a steel truss barn that can be erected by farm labor.

▲▲▲

New England

CONTRACT has been let by Electric Boat Co., Groton, Conn., to H. R. Douglas & Son, Barrows Building, for addition to shipyard, including one-story mold loft, overhead crane structure, storage units, etc., to cost over \$80,000 with equipment. Company is carrying out expansion to handle contract recently received from Navy Department for construction of new submarine.

Board of Trustees, New Hampshire State Hospital, State House, Concord, N. H., has plans for new steam power house to cost close to \$50,000 with equipment. R. D. Kimball Co., 6 Beacon Street, Boston, is architect and engineer.

Central Vermont Public Service Corp., Rutland, Vt., has arranged for a bond issue of \$1,966,000, part of proceeds to be used for extensions and improvements. Company is a unit of Middle West Utilities Co., 20 North Wacker Drive, Chicago.

Massachusetts National Guard, State House, Boston, will soon take bids on general contract through C. F. Springall, 50 Park Street, Malden, Mass., architect, for hangar with repair and service departments, automobile service and garage building and administration building at airport at East Boston.

Edge Tool Mfg. Co., Providence, R. I., recently organized by Edward G. O'Connor, 15 Westminster Street, and associates, plans operation of factory for manufacture of mechanical and edge tools. George A. O'Connor, Providence, will be an official of company.

Following recent receipt of order from metropolitan utilities at New York, for electric meters totaling over \$1,000,000, General Electric Co. has arranged for production at its Lynn, Mass., works, and will advance capacity at once. About 100 men have been added to working force and a similar quota will be taken on early in August.

Conveying equipment will be purchased for a coal pocket to be built by Burton-Furber Coal Co., Boston.

▲▲▲

Pittsburgh

BOARD of Education, McKeesport, Pa., has approved final plans for new vocational and trade school to cost about \$600,000 with equipment, and will ask bids soon on general contract.

Pittsburgh Cut Stone Co., 5116 Cypress Street, Pittsburgh, has plans for new one-story plant, 170 x 200 ft. for cutting, grinding, finishing, polishing, etc., to cost over \$60,000 with machinery. Hunting, Davis & Dunnells, Century Building, are architects.

P. M. Strayer, 1400 Third Avenue, New

Brighton, Pa., and associates have organized Strayer Coin Bag Co., with capital of \$60,000 and 600 shares of stock no par value, to operate local plant for manufacture of bank and office equipment, advertising novelties, metal specialties, etc. Mr. Strayer will be treasurer. A. C. and E. B. Strayer, 712 Allegheny Street, will be officials of new company.

Rail & Lake Coal Corp., Ulmer Building, Cleveland, contemplates construction of wharf and coal tipple on Kanawha River, near Pratt, W. Va., with installation of conveying, loading and other handling equipment.

Quaker State Oil Refining Corp., Oil City, Pa., has been organized to consolidate group of oil refineries in western Pennsylvania, including company of same name, and will carry out expansion and improvements. H. J. Crawford will be president of consolidated organization, which will maintain headquarters at Oil City.

Edward M. Cox, secretary, Munhall School District, 701 Twelfth Avenue, Munhall, Pa., will receive bids until July 28 for general shop equipment, including wood-working machinery, benches, etc., for local schools.

Standard Steel Spring Co., Coraopolis, Pa., has secured contract from Chrysler Corp., Detroit, for springs for new Plymouth automobiles, and contemplates increased capacity to carry out award. Company has also taken a contract for springs and bumpers from another automobile manufacturer.

▲▲▲

South Atlantic

CONTRACT has been let by Campbell Metal Window Corp., Hamburg Street, Baltimore, to Davis Construction Co., 9 West Chase Street, for a one-story addition for storage and distribution, to cost about \$25,000 with equipment. Company is affiliated with American Radiator & Standard Sanitary Corp., 40 West Fortieth Street, New York. Kubitz & Koenig, Emerson Tower, Baltimore, are architects.

Chemical Warfare Service, Edgewood Arsenal, Md., will receive bids until July 27 for heater coils, heater units, cable, toggle bolts, clamps, lightning arresters, etc.

Bibb County Board of School Commissioners, Macon, Ga., will build a machine shop in connection with new dormitory unit at local school, to cost about \$30,000. W. Elliott Dunwoody, Jr., 460 Broadway, is architect; Cecil C. Hays, Grand Building, is associate architect.

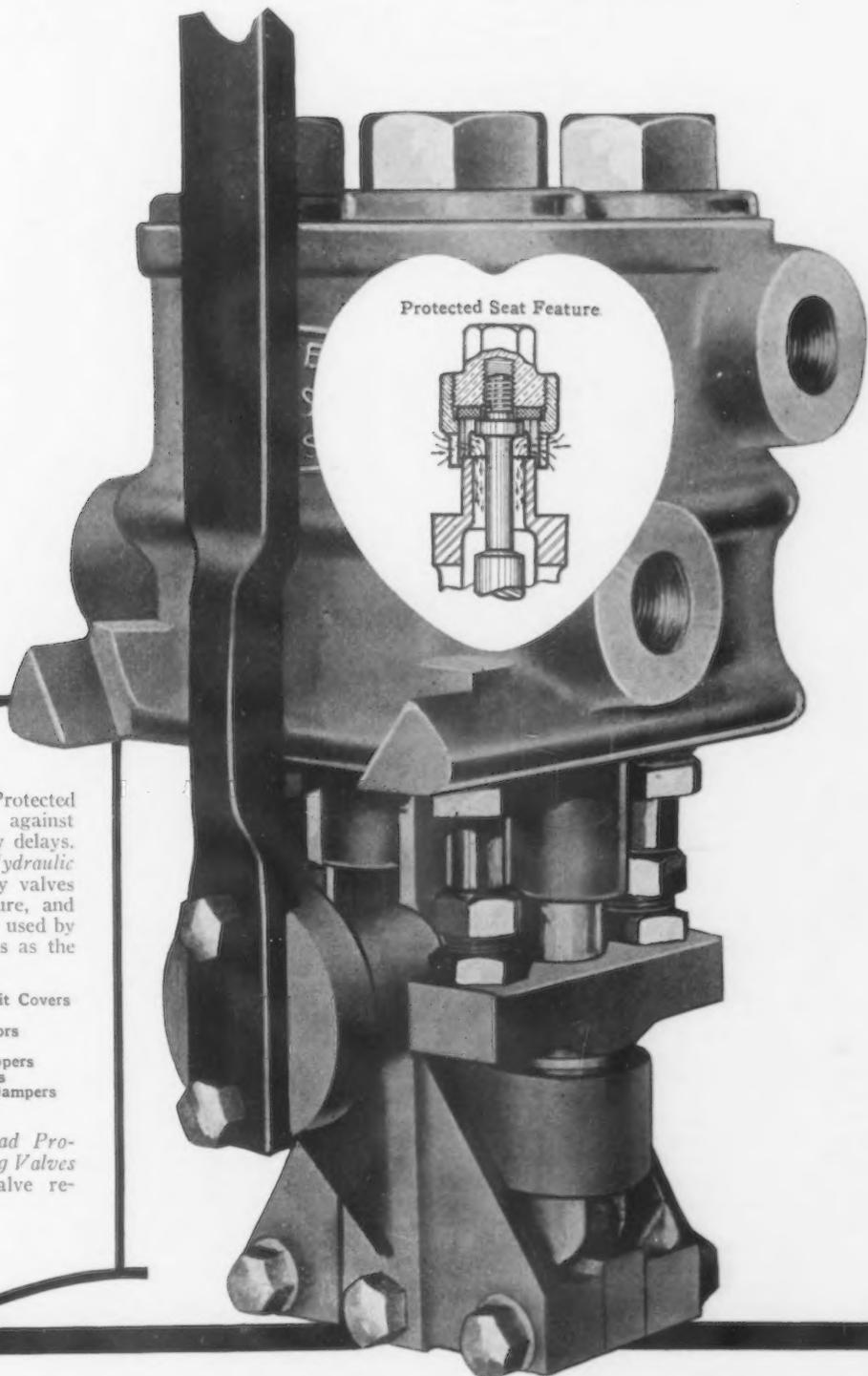
Palmer Stone Works, Inc., Albemarle, N. C., is planning expansion and improvements, including installation of cutting, sawing, polishing and other equipment, to cost over \$70,000.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids (no closing date stated) for an air compressor unit for Norfolk Navy Yard; also for a turbo-generator for Portsmouth, N. H., Navy Yard.

Department of Federal Public Buildings and Parks, Navy Building, Washington, will soon take bids on general contract for an eight-story storage and distributing plant, 214 x 498 ft., to cost over \$1,000,000 with equipment. Lockwood Greene Engineers, Inc., 100 East

For Minimum Operating Costs

Use Homestead Hydraulic Operating Valves



"The heart of the Valve," the Protected Seat, safeguards your plant against undue water losses, and costly delays. Homestead Protected Seat Hydraulic Operating Valves are the only valves that have this patented feature, and that is why they are so widely used by industrial plants for such jobs as the control of:

Hydraulic Presses	Soaking Pit Covers
Hoists	Shears
Lifts	Manipulators
Riveters	Sprays
Spring Benders	Ingot Strippers
Spring Banders	Wire Reels
Spring Strippers	Furnace Dampers
Furnace Doors	Stampers

Be sure to specify Homestead Protected Seat Hydraulic Operating Valves on your next Operating Valve requirements.

HOMESTEAD VALVE MFG. COMPANY

P. O. BOX 137

Coraopolis, Penna.

Forty-second Street, New York, is consulting engineer.

Secretary of Navy, Navy Department, Washington, is asking bids until Sept. 16 for 11 new torpedo boat destroyers. Total cost is estimated at \$49,500,000 or about \$4,700,000 each.

Catawba Boat Co., Hickory, N. C., recently organized with capital of \$100,000 to operate a boat line on Lake Hickory, has arranged with Southern Desk Co., West Hickory, N. C., to build initial vessels at that plant, and work will be placed under way at early date. E. A. and L. S. Ivey, Hickory, head new organization.

In connection with establishment of new airship base at Sunnyvale, Cal., by Navy Department, Bureau of Yards and Docks, Washington, will soon take bids for new steel hangar, 308 x 1118 ft., and 180 ft. high inside, with repair shop, service department and other mechanical facilities, to cost close to \$1,500,000 with equipment. Other hangars, shops and field units will be built later. Entire base will cost about \$5,000,000.

General Purchasing Officer, Panama Canal, Washington, is asking bids until July 27 for manganese bronze rods, cast manganese bronze anchor blocks, cast iron flanges, flanged unions, valves, electric ranges and other equipment; until Aug. 4 for pipe fittings, sash pulleys, metal valves, screws, barrel bolts, rim locks, and other supplies.



Detroit

ARRANGEMENTS have been made by Square D Co., 6060 Rivard Avenue, Detroit, manufacturer of electric safety devices and equipment, for operation of factory branch and service plant at Houston, Tex., under name of Square D Co. of Texas, Inc., recently organized. New company will succeed to works and business of Diamond Electrical Mfg. Co. of Texas, Houston, which became affiliated with Square D Co. last year, and will carry out expansion.

H. & S. Ornamental Iron & Wire Works, Inc., Detroit, has been organized to take over and expand company of same name with plant at 936 Maple Street, specializing in production of iron, steel and wire products. New company is headed by Reinhardt F. Schmidt and Louis E. Beemer.

Detroit Public Light Commission, City Hall, Detroit, has plans for a power substation to cost about \$50,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Board of Public Works, Muskegon, Mich., plans installation of electric-operated pumping machinery, power equipment, mechanical-handling and other machinery in new sewage disposal plant to cost over \$400,000. City engineering department, City Hall, is engineer; Hoad, Decker, Shoecraft & Drury, Ann Arbor, Mich., are consulting engineers.

Harvey Paper Products Co., Sturgis, Mich., manufacturer of paper cups and kindred products, has awarded general contract to Frank L. Shoemaker, Sturgis, for a one-story addition, to cost more than \$40,000 including equipment.

Super Tool Co., Boyer Building, Detroit, recently organized with capital of \$40,000 and 10,000 shares of common

stock, no par value, plans operation of factory for manufacture of tools, industrial diamond equipment and other products. New company is headed by Emil Brocker, 20117 Exeter Street, and Isador Vassenoff, Detroit.

Board of Education, Redford, Mich., contemplates installation of manual training equipment in addition to high school, to cost over \$170,000, for which bids will soon be asked on general contract. Frank Eurich, Jr., Hofmann Building, Detroit, is architect.

Board of Public Works, Escanaba, Mich., plans installation of pumping and power equipment, mechanical-handling and other machinery in new sewage disposal plant to cost about \$200,000. Suhr, Berryman, Peterson & Suhr, Inc., 130 North Wells Street, Chicago, is engineer.

Detroit Ornamental Foundry Co., Detroit, has been organized with a capital of \$20,000 to take over and expand company of same name, with foundry at 1971 Guoin Street, specializing in production of bronze, brass and other metal castings. New company is headed by Emil G. Freeberg and Martin A. Miller, address noted.



St. Louis

PLANS have been completed by Monsanto Chemical Works, 1724 South Second Street, St. Louis, manufacturer of industrial chemicals, for extensions and improvements in storage and distributing plant, 92 x 171 ft., at Monsanto, Ill., to cost about \$30,000. Hoener, Baum & Froese, 3605 Laclede Avenue, St. Louis, are architects.

Cassidy Paper Box Co., Springfield, Mo., care of John Cassidy, Springfield, recently organized by Mr. Cassidy and associates with capital of \$30,000, is establishing plant for manufacture of paper bread trays, boxes, folding cartons, etc., with initial capacity of over 75,000 units a day.

Arkansas Power & Light Co., Little Rock, Ark., contemplates a hydroelectric generating plant on Ouachita River, near Hot Springs, Ark., to cost over \$4,000,000 with transmission system.

Eagle-Picher Lead Co., Temple Bar Building, Cincinnati, is considering erection of a new lead concentrating plant on site to be selected in Tri-State district, Okla., initial unit to cost over \$150,000 with equipment.

Cargill Elevators, Inc., Grain Exchange Building, Omaha, Neb., has awarded general contract to Fegles Construction Co., Wesley Temple Building, Minneapolis, for addition to grain elevator at Fair Acres, near city limits, to cost \$1,000,000 with elevating, screening and other equipment. L. L. Crosby is one of heads of Cargill company.

Arkansas Broadcasting Co., Little Rock, Ark., has approved plans for new radio broadcasting station at North Little Rock, including towers, power station and other facilities. K. F. Tracey is chief engineer.

Kansas Power Co., Topeka, Kan., has plans for a new steam-operated electric generating plant at Dodge City, Kan., with turbo-generator unit, boilers and auxiliary equipment, to cost over \$200,000. Sargent & Lundy, 20 North Wacker Drive, Chicago, are consulting engineers. Company is a subsidiary of North American Light & Power Co., Chicago.

Board of Education, St. Louis, has rejected bids, opened July 8, for 50 items of shop equipment for Herbert S. Hadley Vocational Training School. List included engine lathes, turret lathes, shapers, milling machines, sensitive drilling machines, power hacksaws and grinding machines. Rejection was said to have been on advice of counsel because of a technicality in request for bids. It has not yet been decided whether board will readvertise for bids at once or in September.

Cleveland

PLANS are under way by New York Central Railroad Co., St. Clair Avenue and West Third Street, Cleveland, for an addition to engine house at Collingwood yards, 80 x 175 ft., with repair facilities, to cost about \$65,000 with equipment.

New interests are arranging for lease of plant of Monoblock Rubber Co., Mooreville, near New Philadelphia, Ohio, and will convert works for manufacture of a patented vegetable rack, also battery boxes, rubber flooring and kindred products. New equipment will be installed. Albert O. Price, Dover, Ohio, is interested in new company.

Taylor-Disc Co., Mansfield, Ohio, operated by Sunbrite Mfg. Co., manufacturer of stoves, ranges, parts, etc., is considering rebuilding part of plant recently destroyed by fire, with loss over \$80,000 including equipment.

Euclid Road Machinery Co., Euclid, Ohio, care of Dustin, McKeehan, Merrick, Arter & Stewart, Terminal Tower Building, Cleveland, attorneys, recently organized, plans operation of local works for manufacture of road machinery and parts. New company is headed by A. P. Armington and W. B. Stewart, Euclid.

Dalzell Brothers Co., Youngstown, and J. V. McClaskey, same place, both manufacturers of metal products, have consolidated under first-noted name. New organization will specialize in production of sheet metal goods and plans expansion. J. J. Dalzell will be president, and J. V. McClaskey, vice-president.

City Utilities Department, City Hall, Cleveland, contemplates call for bids soon for steel storage tank for water department, capacity about 1,000,000 gal. L. A. Quayle is chief engineer.

Chicago & Eastern Airways Co., care of Vernon Redding & Associates, Walpark Building, Mansfield, Ohio, architects, has leased hangar to be built at municipal airport by Department of Public Service, Mansfield, A. D. Rowlands, service director, for which plans are being drawn. Unit will include repair and reconditioning facilities, and is estimated to cost close to \$40,000 with equipment.

Cincinnati

BOARD of Education, Columbus, Ohio, plans installation of manual training equipment in new two and three-story high school to cost close to \$400,000, for which bids are being asked on general contract until July 27. Miller & Reeves, 203 East Broad Street, are architects.

Beveridge Re-Needling Co., South Street, Gastonia, N. C., manufacturer of

AMERICAN SHEETS

KEYSTONE
COPPER STEEL

AMERICAN

SHEET AND TIN PLATE
COMPANY

PITTSBURGH

TRADE MARK REG. U.S. PAT. OFF.

AMERICAN

SHEET AND TIN PLATE
COMPANY

PITTSBURGH

TRADE MARK REG. U.S. PAT. OFF.

SYMBOLS— Steel Sheets and Service

There is scarcely a piece of construction or fabrication in these modern times which does not contain sheet metal. Symbols are therefore placed on better steel sheets as signs of quality—and as an assurance of SERVICE. This Company's brands are recognized symbols of excellence.

AMERICAN Sheets offer efficient, economical and substantial *service* wherever used. Supplied in Black and Galvanized Sheets, Special Sheets, Tin and Terne Plates for all purposes; also KEYSTONE Copper Steel products for uses requiring rust resistance; and U.S.S. Stainless and Heat Resisting Alloy Steel Sheets. Write for full information.

Send
for booklets
and weight cards

American Sheet and Tin Plate Company
GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

AMERICAN BRIDGE COMPANY
AMERICAN SHEET AND TIN PLATE COMPANY
AMERICAN STEEL AND WIRE COMPANY
CARNEGIE STEEL COMPANY

Pacific Coast Distributors—Columbia Steel Company, Russ Bldg., San Francisco, Calif.

PRINCIPAL SUBSIDIARY

COLUMBIA STEEL COMPANY
CYCLONE FENCE COMPANY
ILLINOIS STEEL COMPANY



MANUFACTURING COMPANIES.

FEDERAL SHIP'LGD. & DRY DOCK CO.
MINNESOTA STEEL COMPANY
NATIONAL TUBE COMPANY

Export Distributors—United States Steel Products Company, 39 Church St., New York, N. Y.

OIL WELL SUPPLY COMPANY

THE LORAIN STEEL COMPANY
TENNESSEE COAL, IRON & RAILROAD CO.
UNIVERSAL ATLAS CEMENT COMPANY

cotton mill equipment, including general mechanical repair works, is considering establishment of branch plant at Chattanooga, Tenn., primarily for machinery repairs.

Eisele & Co., Nashville, Tenn., manufacturers of thermometers and kindred precision equipment, are planning to rebuild part of plant recently destroyed by fire, with loss more than \$150,000 including equipment.

Highway Department, City Hall, Cincinnati, has awarded general contract to D. Meinken & Son, 2143 Barnard Street, for two municipal automobile service, repair and garage buildings at Madisonville, to cost over \$100,000 with equipment.

National Pumps Corp., Dayton, Ohio, has acquired a controlling interest in Dayton Refrigerating Corp., Dayton, manufacturer of electric refrigerating equipment. Purchasing company will operate as a division of organization and will continue production at present location. Certain branches of manufacture will be carried out at National plant in future.

Contracting Officer, Wright Field, Dayton, will receive bids until Aug. 10 for pump assemblies, strainer assemblies, fuel tank screens, dial and handle assemblies, valve assemblies, etc., until July 29 for quantity of aluminum alloy bolts, nuts and washers; until Aug. 5 for metal wing for airplane.

Martin Garages, Inc., Cotton States Building, Nashville, Tenn., has plans for a seven-story automobile service, repair and garage building with capacity for 400 cars, to cost about \$225,000 with equipment. Marr & Holman, Stahlman Building, are architects.

United Gas Fuel Co., Charleston, W. Va., will build a new compressor plant for natural gas service at Boldman, Ky., to cost about \$100,000 with engines, air compressors and auxiliary equipment. New plant will be operated by Warfield Natural Gas Co., a subsidiary.

Gulf States

PLANS are under way by Indian State Oil Co., Paris, Tex., John W. Sappington, president, for a new local oil refinery, to cost over \$100,000 with equipment. Lamar County Chamber of Commerce is interested in project.

White Shell Corp., Jacksonville, Fla., care of Robert M. Angas, Hildebrandt Building, architect, has plans for new shell grinding and crushing mill, to cost over \$75,000 with machinery.

Texas Power & Light Co., Dallas, Tex., has authorized construction of new transmission line from Nacogdoches to Douglass, Tex., and vicinity, about 10 miles, for industrial service, to cost about \$40,000 with substation facilities. Ford Simpson is district manager at Nacogdoches, in charge.

Central & Southwest Utilities Co., Shreveport, La., has plans by Sargent & Lundy, 20 North Wacker Drive, Chicago, consulting engineers, for addition to steam-operated electric generating plant in Arsenal Hill district, to cost over \$350,000 with transmission system extensions. Station is operated by Southwestern Gas & Electric Co., a subsidiary.

Board of Trustees, Louisiana State

University, Agricultural and Mechanical College, Baton Rouge, La., is asking bids until July 30 for mechanical equipment for new fine arts building and field house, each three stories, to cost over \$130,000. Bids on general contract will be received at same time. Weiss, Dreyfous & Seiferth, Inc., Maison Blanche Building, New Orleans, is architect.

L. E. Snavely, Harlingen, Tex., plans installation of conveying machinery and other equipment in new citrus fruit-packing plant at Mission, Tex., where site has been acquired, to cost about \$60,000. Same interests are now operating similar plants at Harlingen and Weslaco, Tex.

Sinclair Refining Co., 45 Nassau Street, New York, has approved plans for a new oil refinery at Gladewater, Tex., to cost about \$250,000. Project will include bulk oil storage and distributing plant, as well as gathering pipe lines from east Texas oilfields.

Wofford Oil Co., 3331 Ninth Avenue, North, Birmingham, is planning erection of three main bulk oil storage and distributing plants at Reese Ferry on Alabama River, Birmingham, and at Selma. Property has been acquired and about \$500,000 has been arranged for project. Each plant will have waterfront facilities and conveying, pumping and other equipment will be installed. Pipe lines for service at different units will be built.

Maljamar Refineries Co., Artesia, N. M., operated by Maljamar Oil & Gas Corp., has purchased local site from Phillips Petroleum Co., and will erect new oil refinery, to cost close to \$100,000.



Chicago

PLANS have been filed by Century Properties Co., Chicago, care of Huszagh & Hill, 6 North Michigan Avenue, architects, for a hangar, 160 x 220 ft., with repair facilities, at airfield on West Sixty-third Street, to cost about \$85,000 with equipment.

Jefferson Electric Co., Fifteenth and Laflin Streets, Chicago, manufacturer of electric transformers, switches, fuses, etc., has engaged Olsen & Urbain, 228 North La Salle Street, architects, to prepare plans for new one and two-story plant, 325 x 650 ft., on site recently acquired at Bellwood, Ill., to cost \$550,000 with machinery.

Ellis Drier Co., 565 West Washington Street, Chicago, recently organized with capital of \$150,000 and 3000 shares of stock, no par value, plans operation of plant for manufacture of mechanical drying machinery and kindred equipment. Company is headed by Hubert C. Norman C., and Wynn B. Ellis.

Spencer Kellogg & Sons, Flour Exchange Building, Minneapolis, manufacturers of linseed oil products, have awarded a general contract to Fegles Construction Co., Wesley Temple Building, for addition to local grain elevator, to cost about \$100,000 with elevating, conveying, screening and other mechanical equipment. Company engineering department is in charge.

George A. McFarland, State Teachers' College, Minot, N. D., is asking bids on general contract until July 30 for power plant equipment, including one 100-kw. turbo-generating unit; two return tubular

boilers, with safety valves, water gages and auxiliary equipment.

Bureau of Reclamation, Denver, is asking bids until Aug. 17 for two direct pumping units with auxiliary equipment for Wippel pumping station, Kittitas Division, Yakima project, Wash.

Board of Education, Marshall, Minn., is considering installation of manual training equipment in new two-story and basement high school, to cost about \$200,000, for which it is expected to ask bids on general contract early in August. Croft & Boerner, 1004 Marquette Avenue, Minneapolis, Minn., are architects.

Rockford Bolt & Steel Co., Rockford, Ill., has been organized with a capital of \$10,000 to take over and expand Rockford Bolt Co., 100-26 Mill Street, manufacturer of bolts, studs, nuts, etc. New company is headed by S. J. O'Connor, Francis W. and Ray J. Gaffney.

Iowa Railway & Light Corp., Security Building, Cedar Rapids, Iowa, has approved plans for a new power plant near Toledo, Iowa, to cost about \$60,000 with equipment.

Indiana

BOARD of Public Service, Evansville, has awarded general contract to G. H. Bippus, Stratford Apartments, for one-story repair shop, 20 x 75 ft., at municipal airport, to cost about \$20,000 with equipment.

Midwest Elevator Co., West Twenty-third Street and Belt Railroad, Indianapolis, plans installation of elevating and conveying equipment in connection with rebuilding part of plant recently damaged by fire.

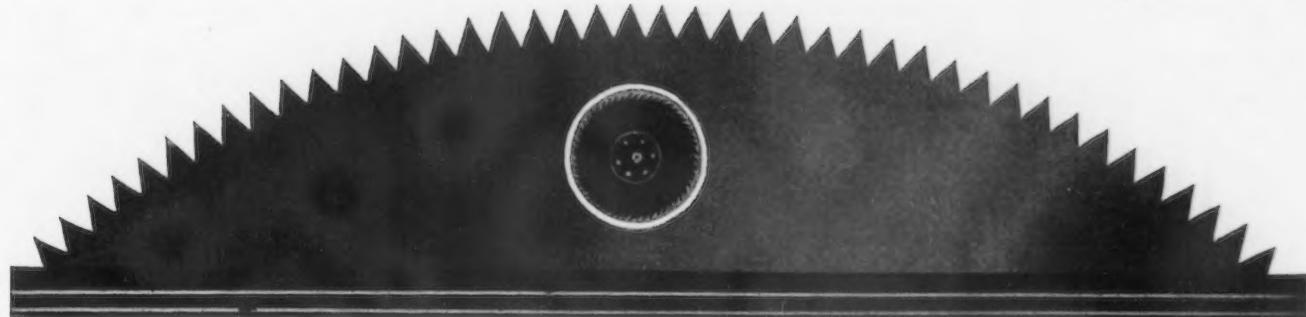
Northern Indiana Public Service Co., Hammond, has applied for permission to dispose of a preferred stock issue to total \$2,000,000, considerable part of proceeds to be used for extensions and improvements in power plants and system, completing a 1931 construction program. Company is controlled by Midland United Co., 122 South Michigan Avenue, Chicago.

Frank H. Reynolds, Terre Haute, and associates have organized Frank H. Reynolds Co., Inc., with capital of \$10,000, and plans operation of local foundry and general machine shop. Ralph A. Edwards and Winfield S. Strong, both of Terre Haute, are interested in new company.

Blackford County Board of School Commissioners, Millgrove, is considering installation of manual training equipment in new two-story and basement school, to cost \$165,000, for which bids are being asked on general contract until July 30. E. I. Brown, First National Bank Building, Fort Wayne, is architect.

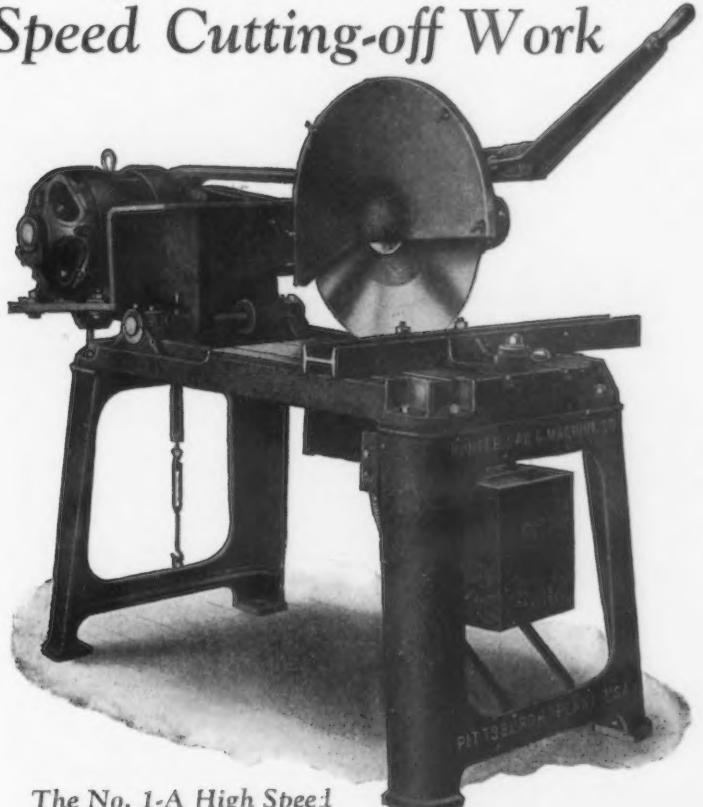
Board of Education, LaPorte, contemplates installation of manual training equipment in two-story and basement high school addition, 78 x 217 ft., to cost over \$175,000, for which general contract has been let to Joseph Goodall, 1622 Michigan Avenue. George W. Allen, La Porte Savings Bank Building, is architect.

American Vitrified Products Co., Brazil, has resumed operations at its plant after a short curtailment and will give employment to a working force of about 120 persons. Company has secured orders that insure present output for at least two months.



HUNTER

*...spells Profit on High
Speed Cutting-off Work*



The No. 1-A High Speed
Metal Cut-off Saw

HUNTER SAW AND MACHINE CO.
5660 BUTLER STREET, PITTSBURGH, PENNA.

BECAUSE of its mechanical simplicity and sturdy construction the operator can speed up production on the Hunter No. 1A without damage to the machine.

The motor and saw blade are mounted on opposite ends of a tilted frame and balanced by adjustable spring tension. Saw arbor is mounted on a double row of deep grooved ball bearings assuring freedom from friction and high speed. Bearings are protected in oil tight, dust proof housings insuring longer life.

This saw is adaptable to a wide variety of work such as light section beams, channels, angles, brass, copper, structural and welded pipe, fire escape material, metal moulding, metal furniture parts, light section pressed and drawn steel shapes.

It will pay you to become thoroughly acquainted with the cost saving advantages of Hunter equipment.

We also manufacture

Inserted Tooth Saws, Circular Milling Saws,
Pneumatic Hammer Rivet Sets, Chisel Blanks
and Hardened Steel Specialties.



PITTSBURGH, PENNA.



▲ ▲ Business as Others See It

Digest of Current Financial and Economic Opinion

OVERSHADOWING all the developments in the national field, the situation in Central Europe continues to attract the larger share of the attention of those whose periodic surveys of business show us what we may reasonably expect in the ensuing weeks.

But, as *Commerce and Finance* reminds us, a moratorium does not add to the world's wealth or to its resources. It merely gives a breathing spell during which recovery of a decent business gait may be attempted. Now, besides the wheat, we still have overproduction of lumber and oil and coal.

Whether the whole moral effect of Mr. Hoover's action has been lost, as *Financial Chronicle* suggests, through France's long delay in giving even a qualified approval may be disputed. But that paper tells us that the huge sums recently loaned to Germany, as a first step in rehabilitation, have now acquired the status of "frozen assets."

Annalist says: "Depressions sometimes culminate in financial panics, and it may turn out that the present crisis will prove to have been the turning point in the world-wide trade depression." *Business Week* remarks that "when deflation drives debtors to default, creditors become moratorium-

minded and expansion is [then] inevitable."

We Are Already on the Way Out

Recovery began in the second quarter. So Harvard Economic Society informs us. Except for construction and mining, "and most persuasively in such general indexes as bank debits, electric power, newspaper advertising and business failures the record . . . , taken in conjunction with the period preceding, indicates persisting stability. . . . In the setting, it appears safe to interpret the reversals in May and June as generally temporary, though expansion may be delayed if European conditions continue threatening."

Persistent activity in the production of consumer goods is noted by both Brookmire and *Annalist*. The latter refers particularly to textiles and shoes—"Thus business activity, as in the depression of 1921, has become subject to a set of influences which ten years ago turned out to be the forerunner of recovery." That authority expects "The vigorous revival which already has occurred in these indexes to be followed, probably very shortly, by a cyclical upswing in steel ingot production and in other producers' goods." Cotton cloth sales in June are noted at 37 per cent above production.

Brookmire classifies these move-

ments in consumer goods as "characteristic of major depressions. These are the early movers." Movement of the winter wheat crop this month should stimulate the languishing railroads. Meantime, June appears to have set a new low on some indexes—lower even than last December; but weekly indexes are upward.

Pathfinders

Textiles, chemical manufactures and radio equipment are looked to by *Commerce and Finance* to lead the march up the slope of returning business volume. The first-mentioned industry is already under way. A strong comeback in the chemical industry is predicted in a report to the American Chemical Society. The radio industry, because of its youth, should be in a "position to assume outstanding leadership in our march out of the abyss."

Meantime a writer in *Mining and Metallurgy* pooh-poohs the idea that China's foreign trade is crippled by the low price of silver. "China mines no silver at all. . . . She does not exchange silver for the things she imports; she exchanges silk, tea, furs, hides, beans, cotton, antimony and tungsten. Ultimately she pays for an American automobile with the proceeds of her exports of silk, and she is paid for this silk on a gold, not on a silver, basis."

Pacific Coast

IN connection with new cement mill near San Jose, Cal., San Jose Cement Co., Ltd., 835 Howard Street, San Francisco, has been organized with capital of \$19,500,000 by Ernest H. Dettner, president of Dettner's Printing House, address noted, and associates. Mr. Dettner will be chairman of executive committee and president. Company has purchased 8-acre tract near San Jose, also extensive limestone properties for raw material supply, and will proceed with project in about 60 to 90 days. It will include power house, packing plant and other structures, and will cost \$2,000,000 with machinery. Fred B. Frank, Sr., formerly president of Keystone Cement Co., will be consulting engineer. Hunt, Mirk & Co., 141 Second Street, San Francisco, are engineers and all contracts will be placed from that office.

Vermont Marble Co., 244 Brannan Street, San Francisco, has revised plans for one-story storage and distributing plant, to cost about \$70,000 with equipment. Lewis P. Hobart, Crocker Building, is architect.

E. J. Summerhays, Covina, Cal., and associates have organized National Orchard Heater Corp., Covina, with capi-

tal of \$25,000, and plan operation of factory for manufacture of heating equipment for fruit orchards. Lewis S. Riley, Redondo Beach, Cal., is interested in new company.

Superior Oil Co., Huntington Beach, Cal., has secured permission to proceed with erection of a gasoline reduction plant on 14-acre tract recently acquired, to cost close to \$100,000 with equipment.

Exeter School District, Exeter, Cal., has authorized installation of manual training equipment in addition to Woodrow Wilson School, for which plans have been completed. Fred Hauenstein is clerk of board, in charge.

Blancher Mfg. Co., Tacoma, Wash., care of Robert M. Davis, 1216 Fidelity Building, recently organized with capital of \$25,000, plans operation of local factory for manufacture of metal products. Erwin M. Blancher will head new company.

City Council, Logan, Utah, has plans for an addition to municipal electric light and power plant, including installation of a new Diesel engine unit, to cost about \$70,000.

Ace Furnace & Steel Works, 3740 South Union Avenue, Tacoma, Wash., manufacturer of furnace equipment, etc., has plans for a one-story addition, 50 x 100 ft. A traveling crane will be installed. Silas E.

Nelsen and Fred G. Rounds, 905 Commerce Street, are architects.

Supreme Wall Heater & Circulator Co., Los Angeles, care of James Westervelt, 402 Southwest Building, recently organized, will operate local plant for manufacture of heaters and heating equipment. Claud E. and Roy J. Chapman head new company.

Canada

A PLANT addition, to cost \$50,000, is under consideration by Guelph Stove Co., York Road, Guelph, Ont.

E. L. Bruce Co., Memphis, Tenn., manufacturer of hardwood flooring, has awarded contract for a plant 40 x 130 ft., at 2280 Dundas Street West, Toronto, to Witchall & Son, 156 St. Helens Avenue. It will be erected on property of R. Laird Lumber Co., Ltd., Canadian agent for Memphis company.

Canadian Industries, Ltd., 1050 Beaver Hall Hill, Montreal, is negotiating for a local site for erection of a plant for manufacture of cellophane, to cost \$1,500,000.

Bids will be called soon by Public Utilities Commission, Ingersoll, Ont., for equipment for new waterworks plant.